JAN 5 1949

Paper TRADE JOURNAL

DECEMBER 30, 1948

Season's Greetings

The strongest part of the closing year's fabric is the many warm friendships it has been our pleasure to enjoy. These old friendships based on years of mutual understanding and confidence are a real incentive to increased service. Together with the new friendships achieved during the year now ending, they are the foundation of all we hope to enjoy in the coming years . . . To all our friends, a very

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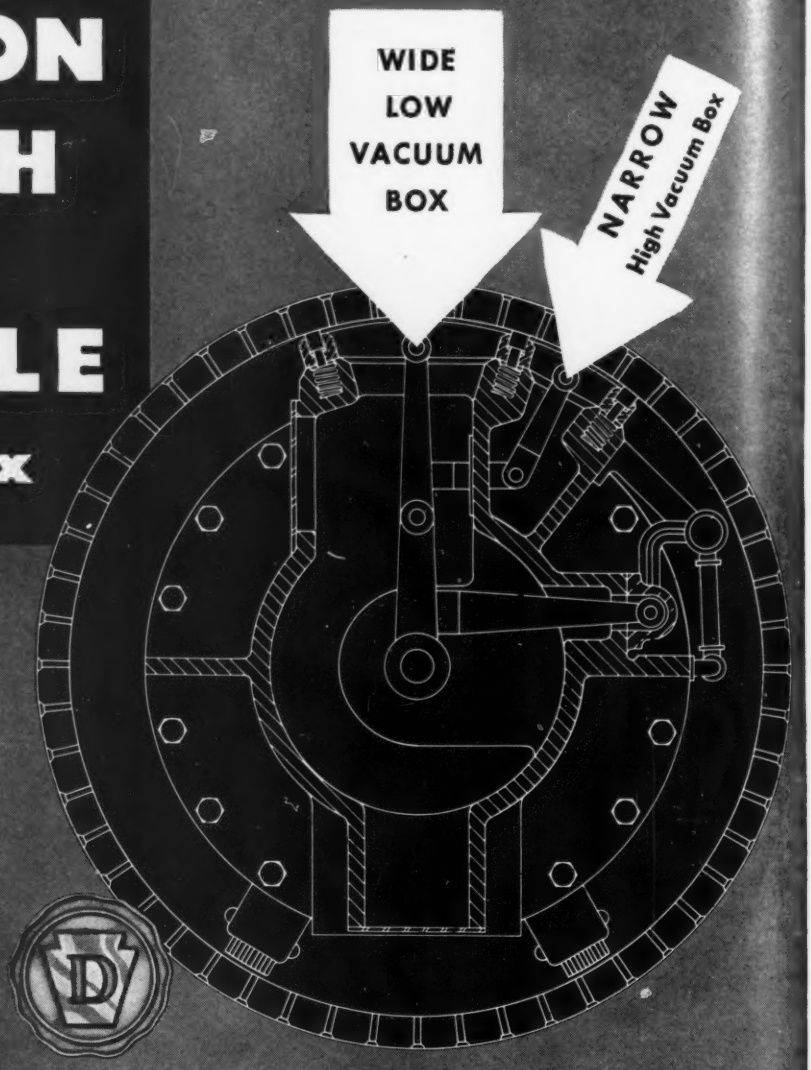


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Paper TRADE JOURNAL
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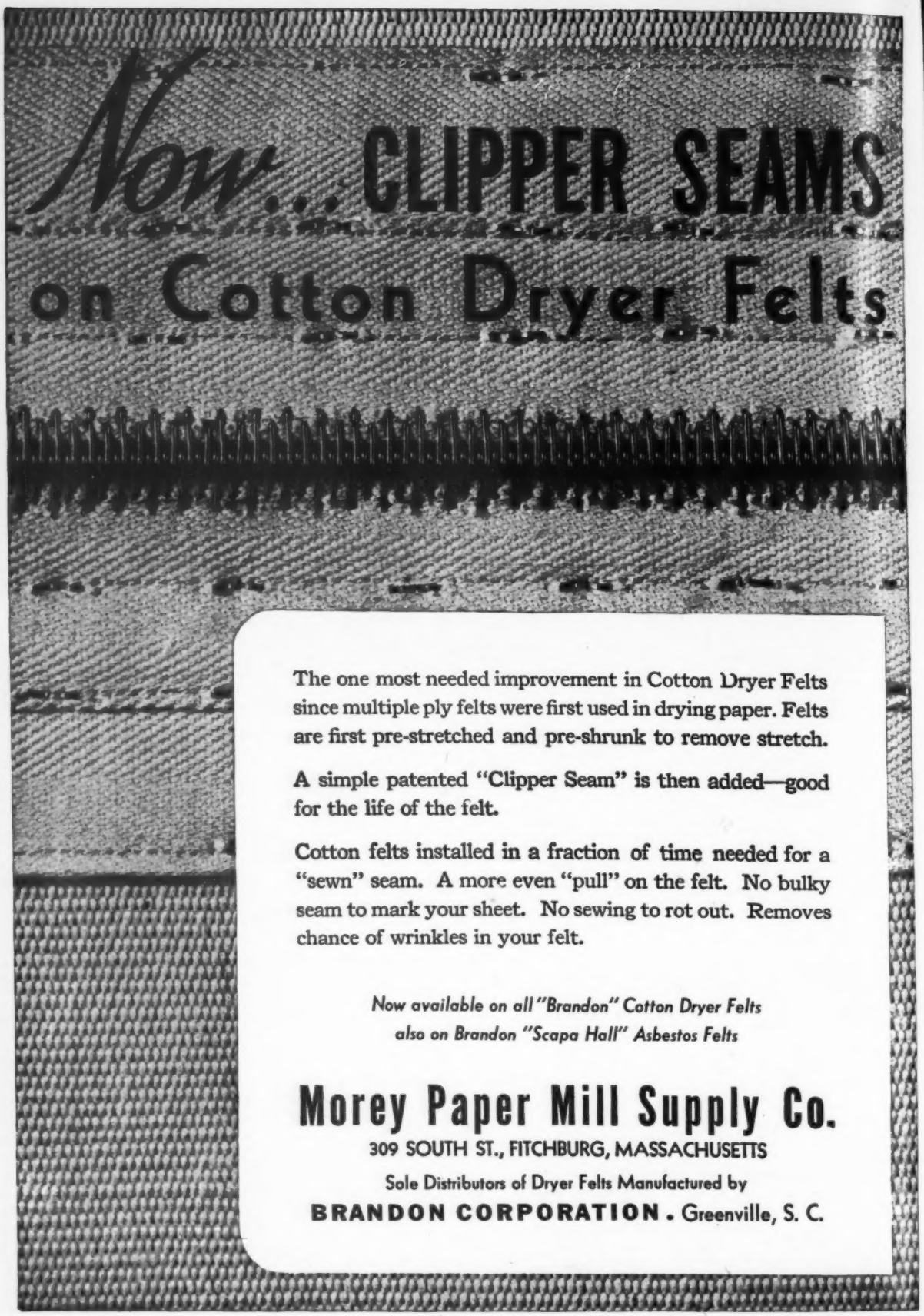


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Dec. 30, 1948

VOL. 127, NO. 27

### 4th Vancouver Island Mill

VANCOUVER, B. C. — The Canadian Western Timber Co., Ltd., plans to start erection of a $30,000,000 pulp mill at Duncan Bay, north of Campbell River, B. C., according to H. J. Mackin, president. Mr. Mackin said that the economic and engineering surveys for the project are almost completed and that construction may start in January.

The Duncan Bay project will provide Vancouver Island with its fourth pulp mill, the third to be constructed since the war. One pulp mill has been operating at Port Alice for years. The second went into production about a year ago at Port Alberni. It was built by Bloedel, Stewart & Welch, Ltd. Work is proceeding on construction of the third mill near Nanaimo. The latter is a MacMillan project.

The Duncan Bay pulp mill, like the Port Alberni and Nanaimo plants, will use power from the B. C. Power Commission's big John Hart Development at Campbell River.

The company has received approval in principle of a forest management license to provide raw material for the mill. It is proposed that the mill will use waste material for operation at the start. Construction will probably take several years.

### N. C. Rail Boost

RALEIGH, N. C.—The North Carolina Utilities Commission on December 21 granted eight short-line railroads a temporary increase of an average of 15 cents per cord in pulpwood rates.

The pulpwood rate increase, authorized pending a hearing, would raise the cost of pulpwood shipping from 92 cents to $1.01 per cord for 10 miles, from $1.12 to $1.22 per cord for 30 miles, from $1.49 to $1.62 per cord for 50 miles and from $1.87 to $2.04 per cord for 90 miles. The eight roads applied for an increase of 65 cents per cord.

The roads contend existing intrastate pulpwood rates are inadequate. As noted, the Utilities Commission last June allowed a general 20 percent increase. Two trunkline roads, the Seaboard Air Line and Atlantic Coast Line, have appealed from the order to Wake Superior Court on grounds that the 20 percent was insufficient and that the commission failed to consider their protests.

# Paper Makers' Get-Together

***Kalamazoo, January 13***

KALAMAZOO, Mich.—The Fourteenth Annual "Paper Makers Get-together" sponsored jointly by the Kalamazoo Valley Section of TAPPI and the Michigan Division of the American Pulp & Paper Mill Superintendents Ass'n. Inc., will be held at Harris Hotel at 6:30 P. M., January 13. Speaker of the evening will be Cola G. Parker, president of the Kimberly-Clark Corp., Neenah, Wis., whose subject will be "What Price Freedom!" William Race, president of the Sutherland Paper Co., will act as toastmaster.

Tickets can be purchased at the cigar counter at the Harris Hotel, from the Secretary of either group, and from Dr. Steve Kukolich, chairman, ticket committee, P. W. Bartholomew, chairman of the Kalamazoo Valley Section of TAPPI, and Herbert Johnston, chairman of the Michigan Division APPMSA report.

**PAUL E. COOPER**

**—president of Pacific Mills, Ltd., Ocean Falls, B. C., was elected chairman of the Western Branch, Canadian Pulp & Paper Ass'n., at the annual meeting of that group on December 20. . . . In addition to the chairman, the personnel of the Western Branch Executive Committee includes: H. S. Foley, president, Powell River Co., Ltd.; Prentice Bloedel, president, Bloedel, Stewart & Welch, Ltd.; Lawrence Killam, president, British Columbia Pulp & Paper Co. Ltd.; D. G. Stenstrom, Columbia Cellulose Co., Ltd.; H. M. Lewis, general manager, Sorg Pulp Co., Ltd.; Logan Mayhew, vice-president, Sidney Roofing & Paper Co. Ltd., and J. A. Young, vice-president, Pacific Mills, Ltd. . . . Mr. Young is the retiring chairman.**

### Reciprocal Trade Pacts

NEW YORK—In reporting developments in current Reciprocal Trade Agreement negotiations, Warren B. Bullock, manager of the Import Committee of the American Paper Industry, said that briefs have been filed in reference to the following grades of paper and paperboard: Sulphite wrapping papers, glassine and greaseproof papers, kraft corrugating board, all types of plain paperboards, with special emphasis on solid woodpulp board, beer mat board, leather and other shoe boards. The pulp producers expressed apprehension of price distortions due to dumping and devaluation of foreign currencies. In most cases the briefs were prepared by the Import Committee. Personal appearance was made only in behalf of the producers of glassine and greaseproof papers.

Representatives of Finnish manufacturers filed briefs arguing for a reduction of the duty rates on pulpboards, fibre boards and glassine paper. These briefs were supplemented by oral arguments before the Committee for Reciprocity Information advocating lowered rates of duty on Finland's principal export grades.

In view of the Administration's declared position in favor of lowered tariff barriers, Mr. Bullock states that he is not unduly optimistic as to the eventual outcome. However, similar factual presentations made in behalf of the paper industry in previous trade agreement negotiations have served at least to modify the extent of duty rate reductions.

### Davis New Sapeye

CHICAGO—Wilmer Davis of the local office of the Rhinelander Paper Co. has been admitted to membership in the Salesmen's Ass'n. of the Paper Industry, Western Division.

# December Pulp and Paper Industry Report

**By W. LEROY NEUBRECH**
**Chief, Pulp and Paper Section, Forest Products Div., Office of Domestic Commerce**

Now that production is basically at a point where it is influenced by demand the economic camera must focus more on markets and consumption than on supply and production. For paper, board and products there are no current data available suitable to analyze actual retail movement or absorption by end consumers. The nearest direct approach is at the wholesale paper distributors' level. For the first time since 1945, paper wholesalers' dollar sales in May 1948 were less than the corresponding month of the previous year, according to Bureau of the Census monthly data. This condition prevailed month to month through October 1948, with the exception of June which was identical to June 1947 and to August which was slightly above August 1947. In fact, for October 1948 the index of wholesale paper merchants' sales was at 257.3, up slightly from September, but down 48.7 points below October 1947. It is obvious that with prices higher than a year previous, actual tonnage sales of paper through merchants was even less than the index figures indicate.

The trend of paper wholesalers' inventories is also important to note. While inventories increased gradually in 1946 and the first half of 1947, it was not until late 1947 through July 1948 that there was a comparatively rapid upturn in merchants' stocks on a dollar basis. Reaching their high point in May 1948 at an index number of 218.4, wholesalers' stocks declined to 201.3 the end of September and 206.6 the end of October 1948.

Indirectly, the apparent consumption trends of paper at retail may be observed by viewing the sales trends of various classes of retail stores. In doing so, it must be kept in mind that the largest field of paper consumption is in the manufacture and distribution of nondurables. Immediately after the war, when consumers' incomes were increasing, the supply of many desired products such as automobiles and new homes were not available so that a larger percentage of the retail sales dollar went into various nondurables. The following table shows that in the first half of 1946 only 19.8 percent of the retail sales dollar went to durables against 24.7 percent in 1939. There has been a steady gain in durable sales in 1947 and 1948, so that in the third quarter of 1948, with more autos, homes, refrigerators, washing machines, etc., on the market, retail sales of durables were 28.8 percent of total retail sales. This has resulted in a like percentage reduction in retail sales of nondurables, which went from 80.2 percent of the total in the first half of 1946 to 71.1 percent in the third quarter of 1948. It will be noted that all major groups of nondurable retail stores in the table, except filling stations, are now getting a smaller percentage of the retail dollar than in 1947 or 1946.

This trend in consumer's dollar purchases between durables and nondurables has resulted in a substantial rise in total durable sales and a leveling in the sales of nondurables which has been particularly apparent since May 1948. This condition, shown in the following table, is an important factor in understanding why demand for paper and its products has also leveled off once that supply met needs in general in the early part of 1948. Comparing October with May 1948, the adjusted index of total estimated retail sales rose 8.9 points, whereas durables increased 31.1 points and nondurables only 1.6 points.

The change in the retail sales-pattern is likewise reflected in industrial production. Considerable paper and board is utilized in the packaging of most nondurables at the point of manu-

**Wholesalers' Sales—Paper and Products**

(Index—dollar basis, 1940 = 100)

| Year | May | June | July | Aug. | Sept. | Oct. |
|---|---|---|---|---|---|---|
| 1948 | 232.0 | 247.6 | 220.3 | 249.5 | 253.4 | 257.3 |
| 1947 | 241.7 | 247.6 | 237.8 | 243.7 | 284.6 | 306.0 |

*Source:* Prepared by Pulp and Paper Section, Forest Products Division, Office of Domestic Commerce, based upon data from the Bureau of the Census, U. S. Department of Commerce.

**Wholesalers' Inventories—Paper and Products**

(Index—dollar basis, 1940 = 100)

| Year | May | June | July | Aug. | Sept. | Oct. |
|---|---|---|---|---|---|---|
| 1948 | 218.4 | 215.8 | 211.8 | 205.3 | 201.3 | 206.6 |
| 1947 | 144.7 | 138.2 | 150.0 | 147.4 | 151.3 | 157.9 |
| 1946 | 103.9 | 102.6 | 103.9 | 103.9 | 106.6 | 111.8 |
| 1945 | 81.6 | 80.3 | 80.3 | 85.5 | 88.2 | 92.1 |

*Source:* Prepared by Pulp and Paper Section, Forest Products Division, Office of Domestic Commerce, based upon data from the Bureau of the Census, U. S. Department of Commerce.

**Estimated Retail Store Sales—1948**

(Seasonally adjusted index—1935-39 = 100)

| Item | May | June | July | Aug. | Sept. | Oct. |
|---|---|---|---|---|---|---|
| Durable goods stores | 355.3 | 376.9 | 389.5 | 405.0 | 396.6 | 386.4 |
| Nondurable goods stores | 321.1 | 324.1 | 319.7 | 316.1 | 322.0 | 322.7 |
| Total estimated sales | 329.5 | 337.1 | 336.9 | 338.0 | 340.3 | 338.4 |

*Source:* Office of Business Economics, U. S. Department of Commerce.

**Percent Distribution of Retail Sales by Kinds of Business**

| | | 1946 | | 1947 | | 1948 | |
|---|---|---|---|---|---|---|---|
| Kind of store | 1939 | 1st half | 2nd half | 1st half | 2nd half | 1st half | 3rd quarter |
| Durable gods stores | 24.7 | 19.8 | 23.2 | 25.1 | 26.3 | 27.4 | 28.8 |
| Nondurable goods stores | 75.3 | 80.2 | 76.8 | 74.9 | 73.7 | 72.6 | 71.1 |
| Apparel group | 7.8 | 9.4 | 8.5 | 8.0 | 7.9 | 7.6 | 7.4 |
| Drug stores | 3.7 | 3.7 | 3.4 | 3.2 | 3.0 | 2.9 | 2.8 |
| Eating and drinking places | 8.4 | 12.8 | 11.8 | 10.9 | 10.2 | 9.8 | 9.6 |
| Food group | 24.2 | 24.8 | 24.9 | 25.2 | 24.8 | 24.8 | 23.9 |
| Filling stations | 6.7 | 4.0 | 4.1 | 4.2 | 4.6 | 4.9 | 4.9 |
| General merchandise group | 15.4 | 14.9 | 14.1 | 13.6 | 13.4 | 12.9 | 13.3 |
| Other retail stores | 9.2 | 10.7 | 10.1 | 9.8 | 9.8 | 9.7 | 9.3 |

*Source:* Office of Business Economics, U. S. Department of Commerce.

**Industrial Production**

(Seasonally adjusted index—1935-39 = 100)

| Item | May | June | July | Aug. | Sept. | Oct. |
|---|---|---|---|---|---|---|
| Durable manufactures | 221 | 222 | 219 | 222 | 224 | 230 |
| Nondurable manufactures | 178 | 179 | 169 | 177 | 178 | 179 |
| Manufactures—total | 197 | 198 | 192 | 197 | 199 | 202 |

*Source:* Federal Reserve Board.

facture. Whereas total manufactures, (on a seasonally adjusted index basis intended to measure the physical volume of output) rose 5 points from May to October 1948, durables increased 9 points and nondurables only 1 point.

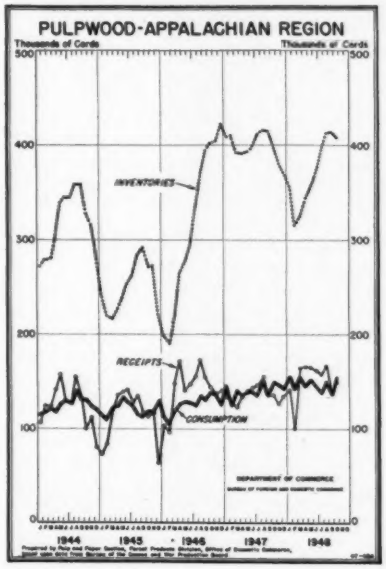
Since it is known that supplies and inventories of most nondurables have been adequate in recent months to meet consumer demands, the foregoing analysis points to a definite leveling in activity in the nondurable field in relation to the prevailing level of the Nation's total economic activity and purchasing power. Perhaps one of the most noteworthy facts is that the percentage of the retail dollar going into nondurables has not only declined 9 percent from 1946, but in the third quarter of 1948 was about 4 percent less than the average of the prewar year 1939.

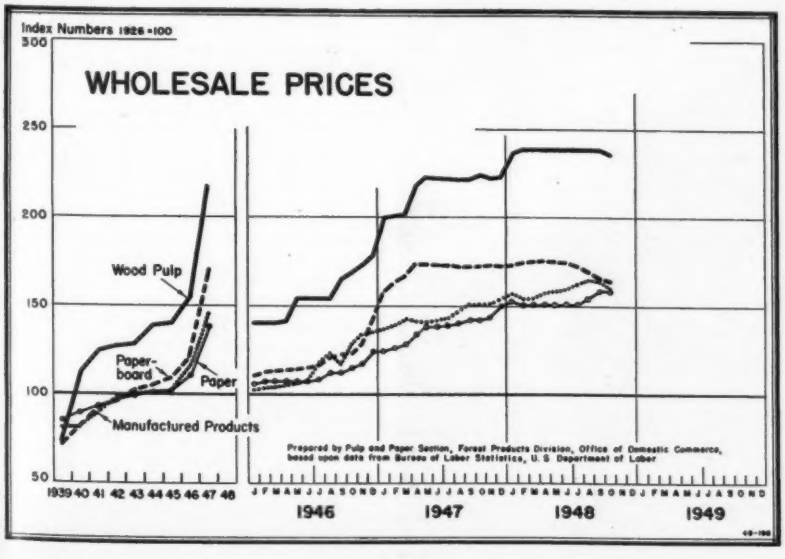
The question arises whether another year or two will witness a slight increase in percentage expenditures for nondurables once that the more important durables have been purchased by consumers. This is probably a realistic expectation which could start to develop in 1949 but may be more obvious in 1950 or 1951. There is also the factor of price which influences purchasers. Reports from some segments of the nondurable industries indicate a recent competitive condition showing signs of price reductions to encourage sales which was not apparent in the earlier stages of the leveling off in nondurables. In the field of paper, board and products, reports from Commerce Department Field Offices covering November and early December indicated some price adjustments, more particularly reports of "dumping" by merchants of some inferior grades purchased at high prices several months ago when "anything was acceptable." In view of the year-end tendency of consumers and retailers to hold off purchases in preparation for annual inventory taking, some further price corrections are anticipated during this period. It cannot be emphasized too strongly, however, that even though the paper market in general has been going through a period of adjustment from a seller's to a buyer's market, and while the pressure of several months ago is completely gone, business is still at a very high level and there is no noticeable concern among manufacturers, distributors, or converters that a slump is in the making but rather as one Commerce Department Field Office reported: "Just good keen business competition with an opportunity for the law of supply and demand to restore a more normal balance."

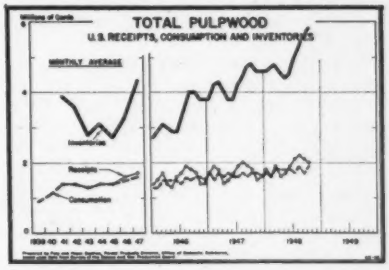
Although modest price competition is generally reported in the field of wholesale distributors, there were very few reports of any price adjustments by paper mills through the end of November. However, for the past few months, mill prices on some grades of paperboard have been downward. The Bureau of Labor Statistics price index (1926 = 100) for October 1948 shows paper as a group at 158.4, the same as September but up about 7 points above August. Paperboard, on the other hand, has dropped to 164 in October from 172.2 in July.

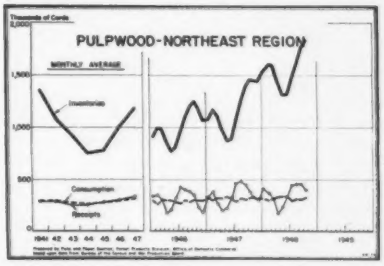
The B.L.S. index also showed a slight decline in domestic wood pulp quotations in October, being 170.2 against 170.9 in September. The greater availability of domestic market wood pulp since the early summer

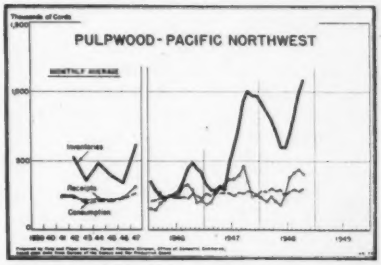
*(Continued on page 52)*

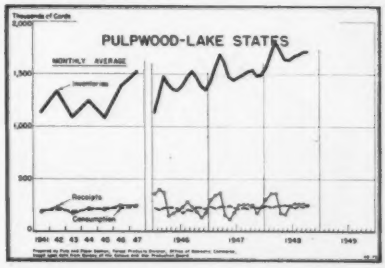


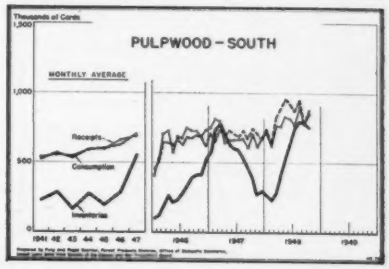



# British Printing, Packaging Research Association In New £110,000 Laboratories

LEATHERHEAD, Surrey, Eng.—A new research center, with some 25,000 square feet of floor area, to house the scientific and technological laboratories of the British Printing, Packaging & Allied Trades Research Ass'n. here was formally opened recently by His Royal Highness The Duke of Gloucester, K.G..

Eleven years earlier he opened the then new laboratories of PATRA near Fleet street, London. In May, 1941, those laboratories were burned out during a German air raid. Work on the site at Leatherhead started in 1946.

Before the war PATRA's work was confined to problems of the printing industry; now the problems of packaging have been added to its field of investigation.

Speaking at a luncheon in London, following the official opening of PATRA House, Sir Edward Appleton, secretary of the British Government Department of Scientific & Industrial Research (which makes annual money grants to research associations, including PATRA), recalled that, during the war, sometimes over 50 percent of certain types of stores reached their overseas destinations damaged—until their packaging was taken in hand scientifically.

Colonel the Hon. John J. Astor, LL.D., of *The Times* (London) was appointed president of PATRA at the Annual General Meeting which followed the luncheon.

PATRA House stands on a four and one-half acre site and is designed and sited to allow further expansion. An outstanding feature is the technological laboratory which runs from the basement floor up to top-story floor level. It affords 20 feet of height and 2,000 square feet of floor area. At basement level are the laboratory for the mechanical testing of packages, the process camera room, and the electro-deposit and stereotyping department, and litho plate-making section. To ensure constant working conditions, the atmosphere is controlled at 65° F. and 65 percent Relative Humidity. The package-testing laboratory is similarly controlled, but contains a variable humidity container - conditioning room with an operating range from 32° F. to 140° F. and 15 to 95 percent R.H.) The main laboratory here is equipped with rotating drums for testing the resistance of containers to rough handling (under controlled conditions), with drop-test apparatus to reproduce the effect on a package of the sudden shock when thrown or dropped in transit, with an inclined plane tester and with a compression tester. Stores, boiler room (for heating the whole building) and air-conditioning plant are also housed in the basement.

At ground-floor level the entrance hall is flanked by a reception office and committee room. Many of the scientific instruments used in PATRA's research work are designed and made in a workshop on this floor. The packaging research laboratory here contains a "make-up" table and equipment for making experimental packages and containers.

Paper and optics laboratories for the study of opacity, gloss, and printing qualities of papers are also on the ground floor. Equipment includes a Patra-Hilger opacimeter and a Patra-Hilger goniophotometer.

Study of the flow and deformation of inks and adhesives is carried out in the rheology laboratory (ground floor), and a constant humidity and paper testing laboratory (maintained at 65°F. and 65 percent R.H.) The entomology, mycology and microscopy laboratory are also on this floor. Infection and damage to packages, books and papers by insects and moulds, a major item on PATRA's research program, is the field covered in the last-named laboratory.

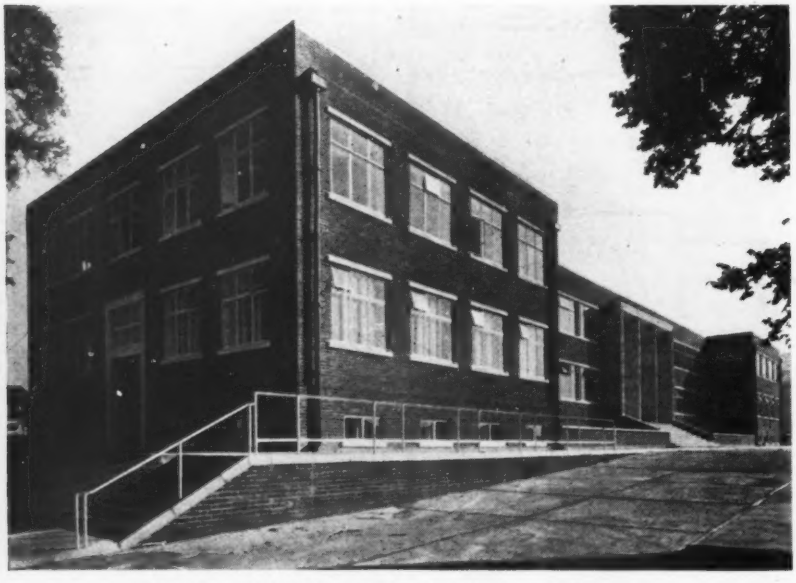
Scientific research on permeability in relation to packaging and packaging materials is the principal task of the packaging laboratory on the ground floor. Here there are a variable high temperature room (for storage trials at elevated temperatures, designed to operate at controlled conditions between 65° and 140° F. and ten percent and 95 percent R.H.) and a constant high temperature room (to operate at constant tropical conditions, 100° F. and 90 percent R.H.) It is interesting to note, in this connection, that PATRA has just published "Packaging Research Report No. 2—The PATRA Tentative Standard Method for the Determination of the Permeability to Water Vapour of Sheet Materials used for Packaging at Temperate and Tropical Conditions," by B. L. Ginsborg, B.Sc., and A. C. Poulter, B.Sc., of the Association's research staff.

Among the laboratories on the top floor of the new research centre is that for surface chemistry where the desensitization of litho plates, contact angle measurement (for fundamental observations of the wettability of surfaces by oil and water), litho plate-grain measurement (already well advanced by earlier PATRA research), anti-corrosion processes for zinc and aluminum litho plates, and research into the influence of silica in desensitizing litho plates, are among the tasks being undertaken. On this floor is also the general enquiry laboratory for dealing with absorption and oxidation drying of printing inks.

To mark the official opening an exhibition of some of the work being carried on, and of the apparatus designed to assist it, was staged.

Finally the building contains offices, a conference room, and a technical

*(Continued on page 36)*



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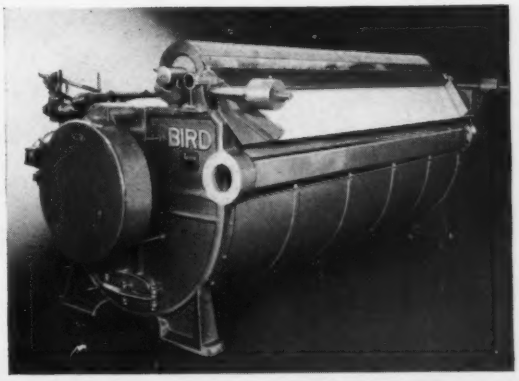


**BIRD MACHINE COMPANY**
SOUTH WALPOLE • MASSACHUSETTS

## Boost Newsprint Shipments

MONTREAL — Canadian newsprint shipments in November totalled 405,923 tons, 3.2 percent higher than in November, 1947.

Shipments represented 107.7 percent of rated capacity compared with 104.2 percent in October and 111.7 in November, 1947.

Canadian production for November was 397,330 tons increase of nine percent over November, 1947 and 105.5 percent of rated capacity.

Shipments from United States mills increased by 8.9 percent and production by 8.8 percent over November, 1947 levels.

Newfoundland shipment increased by 22.8 percent and production by 14 percent.

Stocks of all North American manufacturers decreased by 9,381 tons in November to 138,599.

## Strathmore Elections

WEST SPRINGFIELD, Mass.—At the annual meeting of the Strathmore Paper Co. stockholders on December 20, Nelson Feeley was elected to the board of directors and the following were re-elected directors: G. E. Williamson, C. M. Bryan, A. E. Shattuck, F. N. Bridgham, C. A. Russell, H. J. Rice, B. E. Strafford, R. F. Arnold, L. W. Shattuck, H. E. Riggs, and W. A. McGilpin.

Also re-elected were: F. N. Bridgham, treasurer; P. A. Wilks and George Maxwell, assistant treasurers, and B. E. Stafford, clerk.

Following the annual meeting, the board held a meeting and re-elected the following as officers of the company: G. E. Williamson, president and chairman of the board; C. M. Bryan, A. E. Shattuck, F. N. Bridgham and H. E. Riggs, vice-presidents.

## I. D. Bank of Canada

OTTAWA—The Industrial Development Bank of Canada, organized by the Canadian Government to extend financial assistance to sound industrial enterprises which are unable to obtain their requirements from other sources on reasonable terms and conditions, reports that in the 1948 fiscal year the paper products industry, including pulp, had loans, investments and guarantees with the bank which showed the gross amount authorized to date, less cancellations and reductions in amounts authorized, reached $4,101,700; gross amount authorized during the fiscal year 1948, $521,500. Current authorizations at September 30, 1948 were $3,980,700; amount outstanding as of September 30, 1948 was $3,416,625.

## Western N. Y. TAPPI

NIAGARA FALLS, N. Y.—The next meeting of the Western New York Group, Empire State Section of TAPPI has been scheduled for January 12, at the Prospect House, with dinner at 7:15 P. M.

Speaker of the evening will be Nils Klykken, an engineer representing the Kamyr Corp., of Karlstadt, Sweden. Mr. Klykken is with the Sandy Hill Iron & Brass Works, Hudson Falls, N. Y., the U. S., agent for Kamyr. His speech will be concerned with present-day conditions in Scandinavia and recent developments in their pulp and paper mills.

## ECA Authorizations

WASHINGTON—An increase of $400,000 was authorized in mid-December by ECA in the amount of pulp, paper and paper products to be procured in Canada for the final quarter of 1948 Bizonal Germany account. For the first quarter, 1949, the agency has authorized pulp, paper and paper products, from the U.S.A., up to $50,000 for the Netherlands. A decrease of over $2,000,000 was ordered earlier in a previous procurement authorization calling for woodpulp from the United States for Bizonal Germany. Austria is to receive $17,140 worth of jewelite waterproof paper, hydro-durexil and durexable paper discs, and garnet paper; in addition to other materials to be procured in the United States for ECA shipment.

## Four Oxford Execs. Upped

NEW YORK—R. W. Hovey, vice-president of the Oxford Paper Co., has been elected executive vice-president; Harold H. Holden, manager of sales, has been elected vice-president in charge of sales; Donald Appleton, assistant vice-president, manufacturing, has been elected vice-president in charge of manufacturing, and A. M. McBurney, assistant manager, eastern sales, has been appointed eastern sales manager, effective January 1.

REX HOVEY
Executive Vice-President
Oxford Paper Co.

## NLRB Ruling

SAVANNAH, Ga.—The Southern Paperboard Corp., has been notified by the National Labor Relations Board that for the company to recognize any union at the present time would violate the law, (See *Paper Trade Journal*, Dec. 23, Page 34).

According to the *Savannah Morning News*, eight unions have asked the NLRB for bargaining rights in the new pulp and paper mill at Port Wentworth. Recently, four of the unions struck to force the company to recognize them. Southern Paperboard Corp., refused on the ground that its recognizing the four striking unions as bargaining agents would be an unfair labor practice in violation of the Wagner Act.

The acting chief law officer of the Labor Board's regional office in Atlanta, December 22, sent the following telegram to the company's attorney, T. R. Iserman, in New York:

*"Re Southern Paperboard Corporation 10-RC-247 et al. Execution of recognition agreement or contract with any of unions before board decision would be unfair labor practice. See Pacific Manifolding Book Co., 64 NLRB 1257. Midwest Piping & Supply Co., 63 NLRB 1060.*

*"WILLIAM M. PATE,*
*"Acting Chief Law Officer."*

Ernest Rossiter, president of Southern Paperboard Corporation, said (December 22) that the company is making every effort to terminate the strike. He added that hundreds of employes have called the company saying they wished to return to work. He continued:

"The National Labor Relations Board has the sole right to determine what unions have the right to represent employes in our mill. The law gives to employes themselves the right to vote by secret ballot on whether or not they wish a union to represent them. We cannot take over the functions of the Labor Board and select the unions we will deal with, and we cannot lawfully take away from employes the right to vote by secret ballot that the law gives to them.

"We believe that the Labor Board soon will decide the matter. We are willing to abide by the decision of the board. We think the unions, also, should comply with the law. Instead, they are trying to deprive employes of the right to vote for or against unions to represent them. The strike will not change the law and it will not change the board's decision.

"There is no reason why, instead of losing work and wages in a foolish and unnecessary strike, our employes should not continue to work until the board decides the case. We consider this strike unfair not only to the company, but unfair to the employes as well."

# Station Design and Material Composition As Factors in Boiler Corrosion*

By R. B. DONWORTH[1]

**Synopsis**

*The equipment in a modern power station is composed chiefly of two elements, iron and copper. Other elements, including zinc, chromium, molybdenum, nickel, manganese, tungsten, cobalt, tin, phosphorus, antimony, arsenic, silver, and carbon, are also present in smaller quantities, and they are used principally for alloying purposes in order to obtain certain advantages not possible with simple elements. The purpose of this paper is to show the physical relationship of the materials and the influence of design on both corrosion and erosion and the subsequent carrying of the products into the boiler. The effects of such products in the boiler are the subject matter of other papers in this symposium.*

Although James Watt would today scarcely recognize the power generating equipment which perpetuates his name, the steam part of the most up-to-date power station is in essence little different from that of his early successful design. The limits of pressure and vacuum have been increased, superheat has been added, and the turbine has replaced the reciprocating engine; but the use of partially expanded steam to heat the boiler feedwater is the only truly fundamental change in the cycle. Other changes, great as they are, represent development in degree rather than kind; they have not altered the basic simple process of burning fuel to generate steam which is transported through piping, expanded in a prime mover, condensed, and the condensate or equivalent returned to the boiler.

Improvements of vast importance have nevertheless been accomplished, and they are the result of tremendous striving for greater dependability and economy as well as lower investment costs. It may seem paradoxical that first cost can be reduced by the use of higher pressures and temperatures involving intricate boiler designs, complex controls, and many special aids to service and upkeep; but such is the case. This may be realized, however, by considering that an 850 psi. 900 F. station of today requires equipment to handle and burn only 65 per cent as much coal as a 200 psi. 500 F. station of the same capacity built 30 yr. ago, that the condenser is less than half as large, and that the throttle steam flow in terms of cubic feet per minute is only about 25 per cent as much. These reductions cut down the space requirement and the weight of steel and other materials needed both for equipment and building, and they more than offset the effect of increased wall thicknesses and the use of special alloys required by the higher pressure and temperature. Comparative figures for a low- and a high-pressure station of these respective types are shown in Table I.

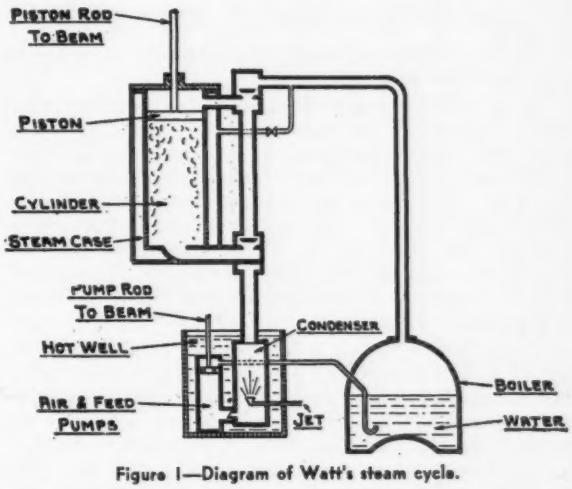


Figure 1—Diagram of Watt's steam cycle.

The development of higher pressures and temperatures has brought profound changes in the duties required of metals. Higher strength is needed to reduce the thickness and weight of pressure parts, and operation at elevated temperatures further accentuates this need. For these reasons carbon steel replaces cast iron as steam conditions approach 250 psi. and 500 F.; low-alloy steels become necessary at temperatures above 750

* Courtesy American Society for Testing Materials.

[1] Betterment Engineer, Power Stations Department, Duquesne Light Co., Pittsburgh, Pa.

[2] The materials used are principally those specified by the ASME Boiler Code and Piping Code, published by the Am. Soc. of Mechanical Engrs. Comparable compositions are covered by A.S.T.M. Specifications A 106, A 158, A 206, A 217, etc., and B 12, B 13, B 111, etc.

[3] The boldface numbers in parenthesis refer to the list of references appended to this paper, see p. 20.

**TECHNICAL DEVELOPMENT**

**Paper Trade Journal, in this section, makes space available for discussion of technical and operating problems. Space is also available for the presentation of independent studies and research on technical and engineering subjects. Feature stories of paper mills, converting plants and inter-related industries will be included. An invitation is cordially extended to all who are qualified to discuss these subjects. Original manuscripts submitted exclusively to Paper Trade Journal and found suitable for use in this section will be paid for immediately upon acceptance. Submit manuscripts to E. P. McGinn, Industrial Editor.**

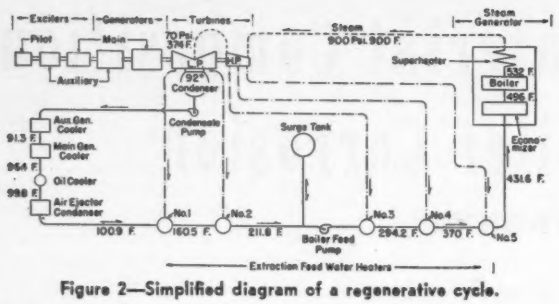


**Figure 2—Simplified diagram of a regenerative cycle.**

F., and the alloys become higher and more expensive as temperatures mount still further.[2]

Along with these developments it has become necessary to increase heat transfer rates, steam liberation rates, and other such factors, so that scale of any appreciable thickness can no longer be tolerated on heat transfer surfaces. This has forced much improvement in the purity of water, which has in turn introduced corrosion problems that were entirely unknown in the earlier era. In addition greater reliability resulting in fewer and shorter outages is demanded, and this also contributes to lowered investment costs.

The development of the steam cycle is illustrated in Figs. 1, 2, and 3. In Fig. 1 is shown Watt's early cycle, and in Fig. 2 a simplified diagram of a present-day regenerative cycle. In the latter the cycle economy is improved through heating the feedwater to the optimum temperature with steam extracted from the turbine, the steam having performed useful work without the loss of heat to the condenser. The fuel consumption of the present-day power station is reduced approximately 7 per cent in comparison to a similar station employing auxiliary exhaust to heat feed water to 212 F.

In Fig. 3 is shown a more complete diagram of the same modern regenerative cycle as that in Fig. 2. This diagram shows the addition of an evaporator, which takes steam from one extraction line and delivers vapor to the heater next below, and it also shows the cascading of drains from each heater to the next.

For purposes of this paper, the fluid cycle is assumed to start at the boiler outlet. Under the most favorable

**TABLE I**

DATA COMPARING A MODERN POWER STATION WITH AN OLDER TYPE STATION.

| | Station A | Station B | Values for B in per cent of A |
|---|---|---|---|
| Throttle steam pressure, psi..... | 200 | 850 | |
| Total steam temperature, deg. Fahr. | 500 | 900 | |
| Station capacity, kw..... | 80,000 | 80,000 | 100 |
| Number and size of units, kw... | 2 at 40,000 | 1 at 80,000 | |
| Type of compound..... | Cross | Tandem | |
| Number of boilers..... | 20 | 2 | |
| Fuel burned, tons per hour..... | 61.0 | 39.5 | 64.7 |
| Steam flow, lb. per hour..... | 992,000 | 734,000 | 74.0 |
| Steam flow, cu. ft. per minute.... | 46,200 | 11,600 | 25.1 |
| Number and size of steam leads, in. | 2 at 24 | 1 at 14 | |
| Weight of steam loads, lb. per ft. | 2 at 171 | 1 at 131 | 38.3 |
| Speed of H.P. element, rpm..... | 1,800 | 3,600 | |
| Speed of L.P. element, rpm..... | 1,200 | 3,600 | |
| Total floor area of turbo-generators, sq. ft..... | 3,550 | 1,540 | 43.4 |
| Total weight of turbo-generators, tons ..... | 1,300 | 419 | 32.2 |
| Condenser surface, sq. ft..... | 2 at 56,000 | 1 at 50,000 | 44.6 |
| Area of boiler room, sq. ft..... | 16,700 | 10,032 | 60.1 |
| Weight of boiler room equipment, tons ..... | 1,924 | 380 | 19.8 |

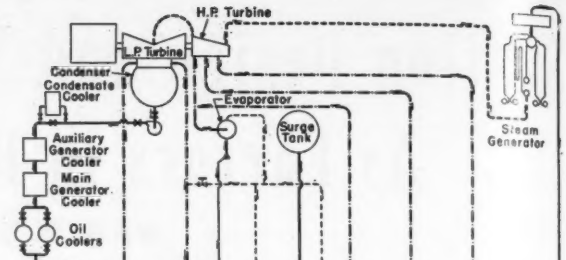


**Figure 3—Complete diagram of a regenerative cycle.**

conditions, the saturated steam contains some solid material carried over from the boiler, and it may also acquire materials from the attemperator which may be used to control final steam temperature. In the superheater this steam and its contaminants come in contact with alloy steels (1)[3] containing chromium, molybdenum, or perhaps nickel, and the piping and turbine parts contain the same materials in various proportions. Some of the substances in the steam deposit in the superheater and the turbine, and some pass through to reappear in the condensate. As the steam is expanded in the turbine, heat is converted into work, the temperature drops, the volume increases, and eventually the dew point is reached. After this point moisture forms in increasing quantity causing erosion of turbine blades and making it possible for some carry-over materials to redissolve. There have been instances of cracking of turbine blades located close to the dew point, and it is suggested here that this may be due to caustic embrittlement in cases where the boiler carry-over contains free caustic.

The turbine exhaust containing approximately 10 per cent moisture then passes to the condenser at high velocity where as a hard driving rain it strikes tubes, baffles, shell, and other parts. The tubes form a very large area of non-ferrous meal which is high in copper content and which may also contain zinc, nickel, tin, aluminum, phosphorus, antimony, arsenic, or any of a number of other materials.[2] The condenser shell and protective baffles are usually of steel or corrosion-resistant iron.

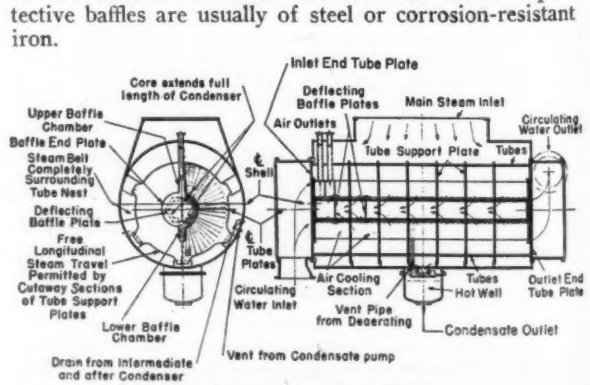


**Figure 4—Condenser flow diagram.**

Thus the condensate leaving the condenser hot well may contain many metal contaminants as well as non-condensable gases and materials contained in the circulating water which may leak into the condensate space, all of this adding to materials carried over from the boiler water originally. The condensate is then moved by a hot well pump having cast iron and bronze parts through oil coolers, hydrogen coolers, ejector condensers, or other heat exchangers, all containing copper or admiralty metal tubes, and thence through one or more extraction heaters to the boiler feed pump where it is in contact with the chromium-steel casing and a chromium-steel or monel rotor. It then passes through several more extraction heaters, the tubing of which is usually admiralty or an alloy of copper and nickel, and thence to the economizer and boiler where it is further heated to the boiling point, converted to steam, and superheated to the required temperature.

The piping up to the boiler is carbon steel, with cast iron valves on the low-pressure side of the boiler feed pump and steel valves on the high-pressure side, the former being commonly trimmed with bronze and the latter with chromium-nickel stainless steel.

### Water, the Great Solvent

It is pertinent here to consider the compound known as water from a different viewpoint, namely, as a solvent, perhaps the greatest of all. It has been said (2)

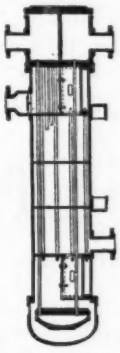

Figure 5—Outline of extraction heater.

that "its action on nature's raw materials might well be compared to the prodigious appetites of swine and the promiscuous nibbling of billy goats; it absorbs large quantities of some materials and at least a small amount of everything with which it comes in contact." It is little wonder, therefore, that condensate, a relatively "pure" water, dissolves to some extent the various metals along its path through the entire system. This solvent action is tremendously enhanced by concurrent erosion, which may not only cut away the metal itself but may also remove protective products of corrosion, leaving fresh metal surfaces open to further attack (3, 4, 5).

### Equipment and Materials

In Figs. 4, 5, and 6 are shown diagrams, of several important pieces of equipment in which condensate makes contact with large areas of non-ferrous metal, namely the condenser, 50,000 sq. ft.; the extraction heaters, five of which total 24,500 sq. ft. including both inside and outside surfaces; and the evaporator, 340 sq. ft. These sizes refer to the requirements of the modern 80,000 kw. station referred to in Table I. In the con-

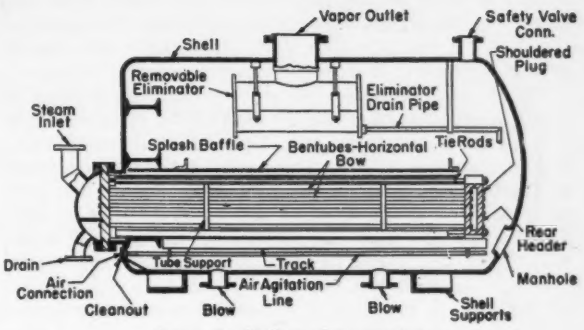


Figure 6—Outline of evaporator.

denser, steam strikes only the outside of the tubes (6), the inside being in contact with circulating water which is rejected from the plant. In the extraction heaters, however, the boiler feedwater commonly passes through the tubes while extracted steam is condensed on the outside and is returned through the heater drain piping, thus making both surfaces part of the feedwater system. In the evaporator, steam and drains touch the inside of the tubes and are returned to the feedwater system, while raw water to be evaporated makes contact with the outside.

In Fig. 7 is a representation of the relative surface areas of different metals passed over by fluids employed in the cycle (steam and water). It is interesting to note that the total non-ferrous area substantially exceeds the ferrous area; and it will be readily realized that the fluids, in making a circuit through such a system, have ample opportunity to both corrode and erode these metals. Steam and water velocities in straight piping can be held to certain limits by the design, but very little control is possible in turbine nozzles and blades or in pump impellers and casings. Local high velocities due to eddying and swirling are difficult to prevent; and in water-steam mixtures the water particles seldom have the same velocity as the steam, and they do not follow the path which frequently must be designed for thermodynamic flow of the steam only.

### Influence of Design on Corrosion and Erosion

In considering this whole problem of corrosion and erosion of metals outside the boiler, it is most important to realize that the power station design engineer today has very little choice of materials, since he must accept much which past experience has developed into current practice. Thus the great need for high-quality boiler water makes the surface condenser a necessity, and the

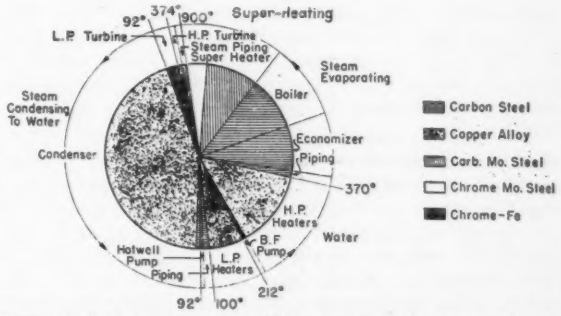


Figure 7—Relative areas of metals in contact with steam and water in regenerative cycle.

complication of pumps and controls associated with contact type extraction heaters has definitely directed the trend to the surface type, both of which requirements at present dictate the use of tubes containing copper.

There are, however, many important situations in which much difficulty can be avoided by proper design. For example, ammonia corrosion of condenser tubes provides an easy way for copper to enter the feedwater in soluble form. Ammonia may enter the system with the raw water either through condenser leakage or with the evaporator vapor. An increase in the general corrosion of the steam side of the condenser tubes due to the presence of ammonia is naturally to be expected, but this in itself is not usually serious. However, condensed vapor dripping over an air offtake baffle may act as a fractionating column *locally* concentrating the ammonia sufficiently to remove copper in serious quantities. One solution of this problem is to provide equipment for removing the ammonia from the make-up water. A more practical solution in cases where the average quantity of ammonia is not too high, is to design the condenser properly with recognition of the manner in which ammonia concentrates. Corrosion by other dissolved gases such as carbon dioxide and hydrogen sulfide obviously must receive similar consideration.

Other instances where design has decreased or minimized the erosion-corrosion of metals include water separation and removal in the low-pressure end of steam turbines; protective baffles opposite the steam entrances to condensers and heaters; deaeration of condensate in the hot well or separate deaerator; arrangement of extraction heater drain equipment to reduce pipe erosion; and, perhaps greatest of all, the development of high initial steam temperatures and reheat temperatures to reduce turbine exhaust moisture.

It is apparent that, while the design engineer can do much toward reducing the erosion and corrosion of metals at many locations throughout the system, nevertheless, under the most favorable conditions some of the metals and their compounds will be transported to the boiler. Further improvement will therefore require much cooperative study and investigation on the part of the chemist, the metallurgist, and the engineer in order to discover and evaluate the effects of these foreign materials, to the end that the proper economic choices can be made for installations of the future. Discussion of some of these effects in the boiler will be left to other papers in this symposium, but it is strongly emphasized here that boiler design will no doubt play an important part in the ultimate solution of the problems.

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(3) H. A. Wagner, J. M. Decker, and J. C. Marsh, "Corrosion-Erosion of Boiler Feed Pumps and Regulating Valves," *Transactions*, Am. Soc. Mechanical Engrs., Vol. 69, No. 4, pp. 389-403 (1947).

(4) Edison Electric Institute Publication P-10, "Boiler Auxiliaries 1946-1947," p 10.

(5) Edison Electric Institute Publication M-6, "Boiler Auxiliaries 1944-1945," p 1.

(6) Edison Electric Institute Publication P-8, "Turbines, Condensers and their Auxiliaries (1945-1946)," pp. 31-34.

# Evaluation of Losses Caused by Slime in Paper Mills

## *II. A Kraft Paper Mill and a Nine-Point Board Mill*

**By CHARLES P. KIRCHEN**[1]

**Technical Service Representative, Buckman Laboratories, Inc., Memphis, Tenn.**

Paper and board production in the south is characterized by a seven-day week with an essentially continuous production schedule. Certain holidays are observed when the mills must shut down. With the exception of these few holidays, the mills continue to turn out large tonnage production with few, if any, scheduled shut-downs.

Particular attention is directed in this paper to the kraft industry which comprises the major portion of paper and board production in the south. This paper covers evaluations of losses caused by slime in a mill making kraft papers and a mill making nine point corrugating board. The same general approach is applicable in any type of paper mill.

The method employed was developed by the staff of Buckman Laboratories, Inc., and is the result of three years of cooperative work with pulp and paper mills in the United States and Canada. The method was first distributed in December, 1946, as a report (1). Further experience with the method proved that the control of slime resulted in savings comparable to those estimated and in some cases substantially more. Additional material and aids were incorporated and the material presented in May, 1948, as a bulletin (2).

Slime control in a kraft mill was the subject of a recent paper by McCall and Hudson (3). These workers presented a general discussion of the economic aspects of slime, machine system clean-up procedures and methods for the control and evaluation of slime control treatments. Wing (6) discussed economics of slime control. He reported on the initial stages of a slime control program in a Canadian newsprint mill with a particularly severe slime problem. An initial expenditure of $0.75 per ton for slime control toxicants was more than justified by reduced lost production time from washups and wet-end breaks. Neal and Jennings (4), reported on a continuation of the work started by Wing and found a net saving of about $0.50 per ton above an expenditure of about an equivalent amount. The saving was again based on a portion of the lost production time alone. The fact that there were additional savings from increased machine speed, reduced heat, fiber and water loss was noted but not evaluated. Stitt (5) reported on the loss caused by slime in a groundwood-sulfite specialty mill and a newsprint mill. This worker presented information supporting the estimate that the loss suffered from

[1] Technical Service Representative, Buckman Laboratories, Inc., Memphis, Tenn.

**Table I**

Monthly data on production and various factors influencing production for paper machine X during a 12 month period

| Date Month | Average net production Tons/24 hr. | Operating efficiency Percent | Lost time in minutes: Partially from slime Min. | Lost time in minutes: Not from slime Min. | Lost time in minutes: Total Min. | Rejected paper and broke Tons |
|---|---|---|---|---|---|---|
| June | 153.91 | 92.34 | 1483 | 1824 | 3307 | 42.76 |
| July | 150.85 | 92.15 | 1799 | 1703 | 3502 | 83.53 |
| August | 139.19 | 88.20 | 1928 | 3318 | 5246 | 90.29 |
| September | 165.92 | 95.75 | 711 | 1065 | 1776 | 61.50 |
| October | 158.44 | 93.95 | 1199 | 1502 | 2701 | 88.48 |
| November | 163.77 | 94.50 | 1408 | 970 | 2378 | 80.01 |
| December | 158.18 | 93.18 | 860 | 1727 | 2587 | 86.37 |
| January | 151.20 | 90.16 | 2373 | 2019 | 4392 | 139.40 |
| February | 149.85 | 91.40 | 1917 | 1674 | 3591 | 94.29 |
| March | 155.53 | 92.35 | 1949 | 1466 | 3415 | 64.72 |
| April | 152.31 | 91.49 | 1569 | 2102 | 3671 | 56.62 |
| May | 158.84 | 92.88 | 1556 | 1621 | 3177 | 62.49 |
| Total | 1857.99 | 1108.35 | 18752 | 20991 | 39743 | 950.46 |
| Average | 155.66 | 92.36 | 1503 | 1749 | 3312 | 79.20 |

slime in the mill producing groundwood-sulfite specialty papers was at least $1.00 per ton and probably more than $1.50 per ton of production. The loss from slime in the newsprint mill was estimated to be at least $2.60 per ton and was probably of the order of magnitude of $6.00 per ton.

### Slime Loss Survey in a Cooperating Mill Producing Kraft Paper

One typical large kraft paper machine was studied in detail for a period of several months. The lost time and certain other factors also were analyzed for an entire operating year. The mill used surface water which was chloramine treated. No chemical toxicants were employed in the machine systems for slime control. The temperature of the paper machine systems followed the seasonal trend in water temperatures. Fresh water varied from 50° F. in the winter to 90° F. in the summer and the temperature of the white water from the machine varied from 80° F. in the winter to 115° F. in the summer. Table I gives monthly data on production and various factors influencing production for the one paper machine during a year of operation. Table 2 gives detailed daily operating data for a 2 week period. The data for these tables were taken from the slime control reports cooperatively kept at the mill and are typical of the data which should be assembled and plotted on the large control charts.

The trend toward increased instrumentation of paper machine operations will enable mills to collect more accurate data from recording charts covering variables, such as suction box, couch and press vacuums. The daily plotting of these data on the control charts together with data on freeness, speed, steam consumption, and production provides a convenient method of following the effect of slime on machine operations.

### Lost Production Time

In both of these tables the lost time classification "Partially from slime" includes wash-ups not required by order changes, wet-end breaks and removal of paper from dryers but did not include wet felt changes, wet felt repairs or calender snap-offs. The lost time classified as "Not from slime" included these items, wire changes, wire repairs, mechanical faults, electrical faults and miscellaneous items not influenced by microorganism growth.

The lost time classified as "Partially from slime" for the machine during a year of operation was 18,752 minutes or 312.5 hours. During the same period the average daily production was 154.83 tons. If one assumes as a conservative estimate that only 20 percent of the lost time classified as "Partially from slime" can be eliminated by controlling slime, the saving is equivalent to 403.16 tons of production. In comparison if we assume the higher but very possible estimate that 50 percent of the lost time can be eliminated, this would be equivalent to 1007.91 tons. Fifty dollars per ton increased net operating income has generally been accepted as a conservative value for extra production after fixed costs have been met in kraft paper and board operations. The magnitude of the loss from lost production time alone thus is indicated to have been between $20,158.00 and $50,395.00 for one paper machine.

### Decreased Equipment Performance

This particular machine and the other machines in the mill were operated at about their drying capacity. Outstanding slime control has often shown that improved water removal at the wet-end of the machine results in a more uniform sheet coming from the dryers. Evidence has been obtained that small but actual reductions in moisture content of the sheet are also realized. It is believed that these are primarily achieved in two ways: First, by the control of slime growth so that slime-bound fines and dirt do not tend to cause filling of the press felts.

Second, by closing up the machine system and running it at higher temperatures, improved water removal on the wire and in the presses is obtained as well as a warmer sheet going to the first dryer.

When some special light weight papers are run at high speeds, formation may be adversely affected by maintaining high temperatures in the machine system probably because of too rapid drainage on the wire. However, in this mill such was not the situation and the machines were operated at approximately 30° F. higher temperatures in the summer than they were in the winter.

Increases of one to two percent in machine speed and in some cases as much as ten percent have been accomplished on the same drying equipment operated at the same steam pressures as a result of outstanding slime control and utilizing these above mentioned two principles. In this connection reduction in the amount of rejected or culled paper is also accomplished when paper is rejected because it is too wet. This usually is the case where there are wet streaks or wet spots in the sheet

caused by non-uniform water removal in the wet-end.

An expected increase in speed of from one to two percent would provide from 560 to 1,120 tons additional production per year for the one machine. Based on $50 per ton this is equivalent to a loss of $28,000 to $56,000 per year from operating at a reduced speed because of slime.

### Loss of Heat, Fiber, and Chemicals In White Water Diverted to the Sewer

No estimate was included of these losses because it would have been necessary for the mill to install modern saveall equipment before employing more white water on the machines. However it is probable that the recovery of heat, fiber and chemicals in the white water going to the sewer would pay for such equipment in a reasonable period of time. The saving from using warm white water in the machine showers instead of fresh water and recovery of the fiber which was discharged to the sewer from this machine alone was estimated to be over $100,000 per year. Fresh water costs were extremely low as it was necessary only to pump the water from a surface source and chlorinate it. It is interesting at this point to note that several mills with expansion programs have been faced with the problem of securing additional fresh water supplies to take care of expanded operations. The cost of securing fresh water today is substantially greater than it was when many of the original units in these mills were built. Therefore, the general program of a greater reuse of white water and corresponding reduction of the volume of fresh water consumed per ton of paper production is certainly a sound venture. Fresh water costs of two to three cents per 100 gallons for filtered water are not unusual. Where large volumes of fresh water are being used on machine showers, it is apparent that a saving in water costs also can be realized.

Mills with adequate saveall equipment providing well filtered white water have found it is essential that slime be effectively controlled or they encounter plugging of the white water showers.

The ever increasing pressure being brought upon mills regarding stream pollution is another strong reason for a greater reuse of white water.

### Decreased Life of Equipment

Corrosive toxicants were not being employed for slime control. There was no evidence of felt degradation as the result of microorganisms.

### Loss of Finished Product

The loss at and after the reel averaged 79.20 tons per month for the paper machine during the year. Detailed inspection of the records for the period from June 1 to July 27 showed that the major cause of broke and rejected paper both at the paper machine and in the bag factory was wet paper. However, substantial amounts of paper also were culled because of slime and dirt spots. If ten percent of the salvaged paper resulted directly or indirectly from slime, which is a conservative estimate, an average of 7.92 tons was lost each month. Based on $50 per ton net operating income for additional production, the paper which was culled had a value of $4,752 for the year. Actually the loss to a mill in such a case is greater because it is a twofold loss. First, the loss of production time during which the paper was originally produced and second, the cost per ton to repulp the broke. In some instances, rejected paper or broke cannot be reused at its original grade. It must be degraded and worked into lower grades of paper or board, which means a further loss.

### Reduced Average Moisture Content

The average moisture content of the 40-lb., paper of the grade which is produced in the largest volume on this machine, was tabulated for the period from June 1 to July 27 and found to be approximately 6.0 percent. Considerable variation occurred in the moisture content which is typical for paper produced on machines where slime is not controlled. With reduced breaks and more uniform operating conditions, which are possible with outstanding slime control, it has been found that higher average moisture content can be safely maintained in the sheets without danger of wet paper. If the average moisture content could have been increased only 0.5 per-

## Table II

Daily data on production and various factors influencing production for machine X during the period from June 1 through June 28. Certain detailed data for only 40 lb. grades.

| Date | Net production | Lost time in minutes—All grades | | | Speed | Average of suction box vacuums | Average suction couch vacuum | Steam consumption | Paper properties—40 lb. | | All grades rejected paper and broke |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | Tons/24 hr. | Partially from slime Min. | Not from slime Min. | Total Min. | Ft./Min. | Inches Hg. | Inches Hg. | Tons/ton | Moisture average Percent | Mullen average Lb. | Tons |
| June | | | | | | | | | | | |
| 1 ..... | 166.29 | 85 | 52 | 137 | 1052 | 4 | 17 | 3.80 | 4.8 | 77.2 | 2.69 |
| 2 ..... | 144.85 | 27 | 93 | 120 | 1020 | 3 | 14 | 2.95 | 4.9 | 80.5 | 1.09 |
| 3 ..... | 128.01 | 72 | 22 | 94 | .... | ... | ... | 2.69 | ... | .... | 2.76 |
| 4 ..... | 133.84 | 17 | 19 | 36 | .... | ... | ... | 2.44 | ... | .. | 1.03 |
| 5 ..... | 162.29 | 14 | 3 | 17 | 1050 | 3 | 15 | 2.81 | 5.8 | 83.5 | 0.38 |
| 6 ..... | 132.77 | 83 | 61 | 144 | 1036 | 3 | 15.5 | 2.65 | 5.4 | 84.9 | 2.22 |
| 7 ..... | 145.16 | 33 | 15 | 48 | 1056 | 4 | 16 | 2.74 | 5.7 | 79.3 | 0.58 |
| Total ..... | 1013.21 | 331 | 265 | 596 | 5214 | 17 | 77.5 | 20.08 | 26.6 | 405.4 | 10.74 |
| Average .... | 144.74 | 47 | 38 | 85 | 1043 | 3.5 | 15.5 | 2.86 | 5.3 | 81.1 | 1.54 |
| 8 ..... | 182.69 | 37 | 10 | 47 | 1052 | 2.5 | 16 | 4.20 | 6.0 | 80.2 | 2.46 |
| 9 ..... | 179.15 | 25 | 2 | 27 | 1052 | 3 | 17 | 3.90 | 5.2 | 81.8 | 0.49 |
| 10 ..... | 137.80 | 92 | 58 | 150 | 1052 | 4 | 17.5 | 2.80 | 5.0 | 83.6 | 5.31 |
| 11 ..... | 145.22 | 119 | 59 | 178 | 1052 | 4 | 18 | 3.29 | 5.9 | 77.3 | 0.31 |
| 12 ..... | 162.36 | 64 | 62 | 126 | 1052 | 3.5 | 17.5 | 3.54 | 5.7 | 79.3 | 1.19 |
| 13 ..... | 152.69 | 36 | 17 | 53 | .... | ... | ... | 3.04 | ... | .... | 2.12 |
| 14 ..... .... | 182.89 | 25 | 10 | 35 | 1052 | 3 | 16 | 4.56 | 5.7 | 79.4 | 2.27 |
| Total ..... | 1142.80 | 398 | 218 | 616 | 6312 | 20 | 102 | 25.34 | 33.5 | 481.6 | 14.17 |
| Average .... | 163.26 | 57 | 31 | 88 | 1052 | 3.5 | 17 | 3.62 | 5.6 | 80.3 | 2.02 |

cent, an additional production of approximately 270 tons per year would have resulted for only the cost of mill service water. An estimate of this value was not included in the survey because a large portion of the paper production was converted in the mills' own bag factory and thus was not sold by weight. However, this phase of an outstanding slime control program has meant a substantial additional operating profit to several mills.

It seems there is potential advantage to be gained from the kraft industry studying the moisture requirements for kraft paper and board in much the same manner as was done by the Canadian newsprint industry.

Outstanding slime control combined with a careful control of other factors influencing uniformity of moisture content should enable production of paper and board with at least 1.0 percent higher average moisture content. It seems probable that a more, rather than less satisfactory sheet could be provided in this way. Over-drying of paper results in increased steam consumption and a deterioration of certain strength characteristics without providing any advantage for a customer storing and utilizing paper under conditions which would result in a higher equilibrium moisture content.

### Loss of Market Acceptance

No estimate was made for the value of being able to supply customers with more paper of more uniform quality. Although intangible, this is of definite value to the company. When supply approaches or exceeds demand and complaints from customers become more insistent, the cost for the service personnel to placate customers and the amount of refunds resulting from complaints about holes, dirt and slime spots will become a more tangible cost factor.

### Summary of Slime Loss Survey

An analysis of the lost time by months for the year for Machine-X is given in Table I. The total amount of rejected paper is also given. Two substantial sources of loss were not included in the calculations of the total. These were: (1) Loss of heat, fiber and chemicals in white water going to sewer; (2) Decreased production from running low average moisture content in sheet.

### Estimated Loss Caused by Slime

The loss suffered from slime was estimated to have been at least 90 cents per ton of production and was probably more nearly $1.70 per ton of production.

### Slime Loss Survey in a Mill Producing Nine-Point Corrugating Board

In this mill nine-point corrugating board was run on two machines all the time and, for purposes of identification in this paper, the machines are identified as Y and Z. The fresh water from the well is chlorinated. Chloramine treatment was added continuously to the white water at the fan pump of each paper machine. A chlorine residual of 3.0 to 5.0 parts per million was maintained in the wire pits most of the time. The average cost for chlorine and ammonia was about $0.25 per ton of board. This was exclusive of maintenance and depreciation for the chlorinators and ammoniators. Other chemical toxicants were used for clean-ups, squirt-ups and treatment of the system at irregular intervals. The losses caused by slime during a year of operation were studied.

### Lost Production Time

Table III gives a detailed distribution of the lost time, as well as certain operating information, for one machine by months for the year. The lost time is segregated into two general classifications as follows: (1) Lost time partially from slime; (2) Lost time not from slime. The lost time classified as "Partially from slime" consisted of that listed under the following headings in the record maintained on machine operations. (A) Wash-ups—Shut-downs to wash-up chests, regulators and wet-end of machines including headbox, wire trays, wire pits, felts, etc.; (B) Slime—Only those wet-end breaks from which the tails showed definite evidence of slime; (C) Breaks—Any break for which the cause was not determined; (D) Wrapped dryers—Time lost in removing paper from dryers when the sheet wrapped around one or more dryers; (E) Lumps—Any break caused by a lump of fibers; (F) Wet felt trouble—Wrinkles, etc., exclusive of washing; and (G) Wet felt changing—Time involved in any wet felt change.

A break-down of the various causes of lost time "Partially from slime" on machine Y during the year is shown in Table IV.

**Table IV**

| | Minutes | Percentage |
|---|---|---|
| Slime breaks | 7,275 | 41.6 |
| Wash-ups | 6,745 | 38.5 |
| Wet felt changing | 1,230 | 7.2 |
| Wrapped dryers | 925 | 5.3 |
| Wet felt trouble | 535 | 3.1 |
| Other breaks | 525 | 3.0 |
| Lumps | 215 | 1.3 |
| | 17,500 | 100.0 |

The other machine running nine point showed about the same distribution of lost time "Partially from slime." Approximately three-quarters of this lost time for the two machines was caused by slime breaks and wash-ups.

It was agreed by the management of this mill that a net operating income of $40 per ton was a conservative value for each additional ton of production obtained after fixed costs had been met.

The lost time classified as "Partially from slime" for Paper Machine Y during one year of operation was 17,500 minutes. During the same period Machine Z lost 21,415 minutes. The total for the two machines was 38,915 minutes or 648.6 hours. Prorating this on the basis of the average production per hour for each machine, it was equivalent to a loss of production from the two machines of 3,697.3 tons.

Careful analysis of the lost time for both machines had shown that approximately 75 percent of the lost time classified as "Partially from slime" had been caused by wash-ups and slime breaks. It was conservatively estimated that 50 percent of this loss could have been avoided by good slime control which is equivalent to 1,848.6 tons. It is very probable that as much as 70 percent of this lost time could have been avoided which would have resulted in an increased production of 2,588.1 tons. Using the value of $40.00 per ton, it was estimated that a loss between $73,900.00 and $103,500.00 was suffered from slime in the form of lost time alone on the two paper machines running nine point board.

### Decreased Equipment Performance

It is believed that additional production can be obtained by running a sheet of somewhat higher moisture content than the previous standard. The moisture content on this sheet had been held relatively low because some board had been rejected as the result of wet streaks when they attempted to run the board at somewhat higher moisture content. For the year studied, the moisture content averaged 6.3 percent for the production of each

## Table III

An analysis of the total lost time resulting partially from slime and certain other operating data for paper machine Y.

| Date Month | Average net production Tons/24 hr. | Speed Ft./min. | Total lost time Min. | Portion of the total lost time in minutes resulting partially from slime: Wash-ups Min. | Slime breaks Min. | Other breaks Min. | Lump breaks Min. | Wrapped dryers Min. | Wet felt trouble Min. | Wet felt changes Min. | Total partially from slime Min. | Steam consumption[1] Tons/ton of paper | Moisture content Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 126.24 | 648 | 2670 | 715 | 460 | 0 | 15 | 40 | 60 | 0 | 1290 | 4.59 | 6.3 |
| B | 132.50 | 661 | 2185 | 580 | 570 | 25 | 5 | 10 | 35 | 50 | 1320 | 4.79 | 6.1 |
| C | 130.98 | 656 | 3160 | 470 | 685 | 75 | 0 | 80 | 40 | 150 | 1500 | 5.36 | 6.3 |
| D | 123.41 | 652 | 3820 | 550 | 980 | 100 | 15 | 175 | 120 | 140 | 2080 | 5.29 | 6.3 |
| E | 126.94 | 657 | 2840 | 510 | 675 | 35 | 45 | 60 | 95 | 140 | 1560 | 4.84 | 6.1 |
| F | 129.69 | 656 | 2450 | 820 | 475 | 80 | 75 | 20 | 85 | 115 | 1670 | 4.52 | 6.3 |
| G | 128.74 | 642 | 2580 | 405 | 405 | 40 | 10 | 75 | 30 | 45 | 1010 | 4.60 | 6.3 |
| H | 132.80 | 676 | 2990 | 635 | 835 | 65 | 30 | 165 | 0 | 90 | 1820 | 4.86 | 6.3 |
| I | 131.12 | 654 | 3385 | 350 | 320 | 25 | 0 | 30 | 25 | 115 | 865 | 4.07 | 6.2 |
| J | 136.34 | 673 | 2245 | 545 | 770 | 0 | 0 | 30 | 30 | 120 | 1495 | 4.11 | 6.5 |
| K | 139.06 | 684 | 2235 | 580 | 510 | 45 | 20 | 210 | 15 | 185 | 1565 | 4.32 | 6.6 |
| L | 134.37 | 664 | 3760 | 585 | 590 | 35 | 0 | 30 | 0 | 85 | 1325 | 4.31 | 6.9 |
| Total | 1572.19 | 7923 | 34320 | 6745 | 7275 | 525 | 215 | 925 | 535 | 1235 | 17500 | 55.66 | 76.2 |
| Average | 131.02 | 660 | 2860 | 562 | 606 | 44 | 18 | 77 | 45 | 102 | 1458 | 4.64 | 6.3 |

[1] Includes all steam delivered to paper mill for use in turbines and dryers as well as heating the building and machine pits when steam is used for latter two purposes.

of the machines. The equilibrium moisture content of this type of board is between eight and nine percent at 50 percent relative humidity and 70° F.

The sheet goes to the dryers with about 65 percent water. Running one percent higher moisture content in the finished board would result in a reduction of 1.72 percent in the amount of water which had to be removed by the dryers plus the additional fact that the last portion of moisture is removed at a much reduced rate compared to the overall drying rate of the machines. It was conservatively estimated that the overall result of running at one percent higher moisture content, an average of 7.3 percent moisture instead of 6.3 percent, would be a two percent increase in production since dryer capacity was a limiting factor. This would increase production 1,934 tons representing a value of $77,360 based on a net operating income of $40 per ton of additional production.

### Loss of Fiber, Heat and Water

The volume of water going to the sewer from the two machines running nine point was about 16,700 gallons per ton of production. The fiber content of the white water was about six tons of fiber per day. At a value of $60 per ton for this fiber, the loss was $126,000 for a 350-day year. This value was not included in the estimation of total losses because of the necessity of enlarged saveall capacity before the fiber could be recovered and increased amounts of white water reused on the machines. The differential in temperatures between the fresh water and the white water diverted to the sewer was only about 10°-15° F. all year round, which in view of the relatively low steam costs enjoyed by the mill did not represent a large loss.

No concerted effort was being made to save fresh water as the mill had an adequate supply. The machine showers were generally operated on fresh water. When slime conditions were not too severe, white water was used in some of the showers.

### Decreased Life of Equipment

Chloramine treatment of the white water at the fan pump to the point where residuals had run as high as 3.0 to 5.0 parts per million in the wire-pit white water would normally be a dangerous practice from a corrosion standpoint. However, in this mill no corrosion difficulties were observed because of the high pH at which the stock was run.

The felt life on the machines was satisfactory and it is doubtful if any marked extension of felt life would result from an improved slime control program.

### Loss of Finished Product

No records were kept of the amount of broke and rejected board. Therefore, no estimate could be made of this type of loss.

### Estimated Loss Caused by Slime

The loss suffered from slime for the two machines studied was at least $1.55 per ton and probably greater than $1.90 per ton. These estimates do not include the possible saving in fiber being lost in the white water going to the sewer or loss of finished product.

### Summary and Conclusions

Approximately half of the paper and board production in the United States is now made in the south. Millions of dollars have been and are being expended to build new mills and expand the capacity of existing mills. A substantial portion of the money expended for paper mill modernizing is for equipment to improve the removal of water from the sheet at the wet-end of the machine. Increased use of vacuum equipment, longer wires, improved press sections all will assist in water removal. Installation of additional dryers or replacement of the original dryers with larger dryers capable of operation at higher temperatures will increase the drying capacity of many machines. Developments are proceeding on "hot stock refining" and a definite trend is underway toward the maintenance of higher temperatures in machine systems. All this is being done to increase production.

In this paper we have shown the losses in production which were suffered from slime by machines in two different southern mills. Certainly slime control warrants careful consideration as one means of increasing production and reducing costs which can be accomplished without significant capital expenditure. Slime control is important also if the potential advantages of new equipment are to be fully realized and it merits attention by design engineers in designing machine systems in which

slime control can be achieved at minimum cost for toxicants. Severe slime conditions have developed in new machines and in new mills before they have been in operation a few months.

Losses from slime in many mills have been found to be as great as one to two dollars per ton of production. When one considers that mills producing upward from 400 tons per day are common in the south, it is apparent that in those where slime losses are being suffered, the annual losses are great.

An evaluation of the magnitude of the losses caused by slime in a mill is a sound first step and should be made so that an appropriate amount of money and time can be budgeted for the slime control program. After these losses have been carefully ascertained, the program of slime control can be initiated based on the principle of treating to a degree that provides the maximum net saving above the cost of the slime control toxicant employed.

The need for careful following of the losses caused by slime is as great in new mills and in new machine systems as it is in older ones. By the use of the slime measuring unit, the slime control report form, and the large control chart, those charged with the operation of the new production equipment can closely follow the influence of slime on the process.

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# History and Growth of Newsprint Industry In the South


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As man slowly emerged from the dark ages in his struggle toward civilization he was in constant search for some material that would serve as a medium on which to record his thoughts and observations. Such materials as stone, clay, wooden tablets, animal skins and vegetable forms have been used for the preservation of early history and records. Some of these materials could not stand the test of time, while others were too cumbersome to carry about.

Cotton and linen rags were later used as basic materials for making sheets of paper — at first the process was entirely by hand, then gradually being supplemented by mechanical devices. As years passed the growing demand for paper in greater volume at lower costs led to experiments in papermaking with grass, stalks, reeds, seaweed and other fibrous materials, none of which proved to be entirely satisfactory.

It was not until 1850, or about 100 years ago, that *wood pulp* was brought into use, becoming more and more in demand as a raw material with the growth of the industry, until now practically all of the *mass* tonnage made in this and other countries utilize various species of wood, processed into mechanical and chemical pulp and then into paper and paperboard products.

The paper industry in the United States had its beginning in New York and the New England states, first utilizing rags and linen waste but later when wood pulp was brought into use as a cheaper and more abundant raw material, the industry spread through the North Eastern timber belt using the dense stands of spruce. It was in this area that the newsprint industry expanded and flourished within the limits of the available wood supply. The industry later spread to the forest areas in the Mid-Western states, and in some degree to the West Coast.

At the turn of the century the growing demand for newsprint made it necessary to reach out further and further for pulpwood supply, leading to the establishment of new industrial areas on the Continent. *Canada,* with its vast timberlands and numerous rivers capable of supplying transportation for pulpwood as well as power and water for pulp and paper mills, was the logical direction in which the paper industry was to spread. The apparent limitless stands of spruce along the coast line and inland areas was the ideal raw material needed to meet the ever increasing demands for newsprint, inspiring industrial leaders to construct many new mills and open up new frontiers during the next thirty years. This expansion was gradual at first, gathering momentum with the development of larger machines, heavier machines, faster machines, backed up by larger pulp producing equipment, making possible greater unit production per machine and per mill. The construction pace accelerated in the early 'twenties, and for the next ten years Canada and the Provinces witnessed the greatest expansion of newsprint production capacity in any one decade in its history.

As this great growth was being brought about in Canada the production capacity of newsprint in the United States mills remained almost static, reaching the peak annual production of 1,680,000 tons in 1926. The annual U. S. production decreased gradually from that year until 1938 when the tonnage was but *one - half* that of 1926. During the same period the tonnage from the Canadian mills increased more than *one hundred* and *fifty percent.*

It was about 1936 when the newsprint production was on the decline in the U. S. mills and on the increase in the Canadian mills, that consideration was being given by industrial leaders and publishers in the South to the feasibility of manufacturing newsprint from Southern pine. Such a mill, successfully operated, would provide new use for an abundant raw material and further augment the supply of newsprint for American newspapers which are, by far, the greatest consumers of newsprint in the entire world.

While the vision of a Southern newsprint mill was talked about among business leaders, both within and outside the paper industry, the idea received its greatest impetus toward

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reality through the efforts of such leaders as Dr. Charles Herty, Francis P. Garvin, Louis Calder, Albert Newcombe, Ernest Kurth, E. M. Dealey, E. K. Gaylord, J. H. Kurth, Jr., George F. Hardy, and others.

Francis Garvin, who was head of the Chemical Foundation Company, was instrumental in providing support for experimental work carried out over a long period of time at the Savannah Laboratories, where it was demonstrated that it was feasible to make newsprint from Southern pine. Mr. Garvin gave considerable time, effort and financial support to this work, and when successful demonstrations were proven he interested prominent leaders in the paper industry in the idea of building a complete mill to manufacture newsprint on a commercial basis, suggesting that the *State of Texas* possessed the requisites to meet the requirements for such a development.

Industrialists and business men in Lufkin and the East Texas timberbelt area visualized the possibilities and the importance of such a development. Chief among these industrialists was Ernest L. Kurth who, despite heavy responsibilities and manifold interests, gave unselfishly of his time and talents, working in collaboration with Louis Calder and Albert Newcombe of the Perkins-Goodwin Company, to plan a course in developing this pioneering industry.

An organization committee was formed in January, 1937, to coordinate all efforts, decide on financial structure, appoint a consulting engineer and select a site for the mill. George F. Hardy's organization, who were employed as engineers, made a survey of various strategically located sites in the East Texas timberbelt area culminating in the selection of Lufkin as the logical location for the first southern newsprint mill—for at Lufkin they had the available wood, water, fuel, and transportation necessary to insure successful and economical operation of not one but several units.

Southland Paper Mills, Inc., began its corporate existence under charter in May, 1937, and during the months that followed the organizing group of industrial leaders and publishers proceeded with engineering and financial plans, surmounting numerous obstacles that normally confront such an undertaking. Progress was slow, however, and in June, 1938, the original charter was superseded by a new charter and the original company reorganized under the leadership of E. L. Kurth as president.

Financing the first newsprint mill in the South, like financing many other untried enterprises, was beset with numerous difficulties, but the integrity and fortitude of the company officials were the motivating forces that induced individuals and publishers to contribute their dollars in excess of the required private capital. This was an important contributory factor to the successful culmination of negotiations with the R.F.C. for the major portion of the total capital needed to construct this new industry.

While financial arrangements were being negotiated, other groups were engaged with such problems as wood, water, fuel supply and preliminary engineering surveys.

Lufkin is somewhat centrally located in the vast area of East Texas pine *timberlands*, offering favorable condition for procurement as well as for transportation of pulpwood both by rail and highway. The large acreage of the local lumber companies, who were also interested in the Southland project, was made available through agreement for selective cutting and thinning operations which, together with wood obtained through contractors and cuttings from private lands, national forests, and Southland properties, assured the mill of a continuous supply of pulpwood needed for the first unit as well as for long range planning.

As a continuous supply of clear water was also of prime importance it was deemed necessary to make a careful and accurate appraisal of the water bearing sands in this area. Surveys made by U. S. geologists, working in conjunction with Texas State geologists, assured the company that adequate ground water, which proved to be of ideal quality for paper mill use, could be pumped from the deep water bearing sands. Here again it was necessary to take the long range view, extending the exploration work over a wide area to be certain that a perpetual supply could be obtained not only for a one unit mill but for a possible second or third unit if conditions should warrant such expansion in future years.

Natural gas available in abundant supply from Texas and Louisiana fields was the most logical as well as the most economical fuel for steam and power generation. Self contained newsprint mills create enormous power loads in the pulpwood grinding process, and by the use of natural gas fuel Southland could develop its own power at a cost comparable with price of hydro power used in the newspaper mills operating in the Northern areas. The matter of fuel supply was simplified as the chosen mill site was adjacent to a large high pressure gas transport main direct from the gas fields.

The engineering studies and plans were made by George F. Hardy, a prominent paper mill engineer and an outstanding factor in the development of the paper industry in the United States and Canada. The proposed mill was of the same pattern and would utilize similar types of equipment then in service in other newsprint mills, following a general plan of low cost construction consistent with the greatest economy of operation. The engineer's report on the project, giving estimates of construction and operating costs, reflected the low costs of wood, fuel and other economics then prevailing in that section of the country. In his opinion this proposed newsprint mill, under efficient management, could be operated profitably, which opinion I might say has proven to be correct.

The financing and all preliminary studies and surveys were about completed by December, 1939, when the contract for constructing the mill was awarded to Merritt-Chapmann & Scott Corp. On January 15, 1939, ground was broken for the mill on a site about three miles east of Lufkin, and thus began the construction of the first mill to manufacture commercial newsprint from Southern pine.

The year 1939 was taken up with engineering, planning, purchasing and constructing. This original mill, which had a rated capacity of 150 tons of newsprint per day, included a 234-inch high speed paper machine, hydraulic type grinders, groundwood deckers, screens, chests, broke beaters and such equipment common to paper mills. The power plant included three high pressure boilers and two 6,000 KW turbines.

The preliminary plans also included a kraft pulp mill and bleach plant, but because of the added initial cost and possible delay in completion, that part of the construction was postponed, and arrangements were made with the Champion Paper Company at Pasadena to supply the semi-bleached sulphate pulp required as part of the newsprint furnish.

Although ground was broken in January, 1939, actual construction did not begin until March, and following 10½ months of active and well coordinated construction work the mill was completed and turned over to the operating crews for the first commercial run of newsprint on January 17, 1940. The usual troubles encountered when starting a new mill, of course, occurred at Southland, but they were of minor importance compared with the big question — could commercial newsprint be successfully made from Southern pine?

It is needless to say that paper made during the trial runs could not be classified as a good grade of newsprint, but the supervisors, technicians, and crews worked with the zeal of crusaders, gradually improving the quality of the product until it was made comparable with the average commercial newsprint, while today it rates well among the higher grades on the market. The first machine started operations at about 600 ft. per minute with outside predictions that a commercial sheet could not be made from pine at speeds higher than 1,000 f.p.m., but papermakers are not easily discouraged and it was not long before the machine

was brought up to 1350 f.p.m., increasing the contemplated production from 150 tons to 170 tons per day.

Late in 1941 plans were gotten under way for the construction of a 175 ton per day kraft pulp mill, including a cylinder machine and a bleach plant of sufficient size to supply semi-bleached sulphate for the newsprint machine. Construction was started in January, 1942, but due to many difficulties arising from the prosecution of the war, the kraft mill project was not completed until January, 1944. With its completion, however, the Southland mill was equipped to manufacture all of its own pulp, both mechanical and bleached chemical, needed for newsprint as well as a considerable amount of machine dried kraft pulp promptly allocated for use in the war effort.

Ever since the idea of a newsprint mill was conceived in Lufkin the management envisioned not one but two and possibly three paper machines, but the trying experience of building a kraft mill during war years made it advisable to stabilize operating conditions and postpone further expansion until a more opportune time.

With the termination of the war our minds were once again directed toward the idea of a second machine and after the decision to proceed was made by the directors, orders were placed for all major equipment which could be obtained only on a long time delivery basis.

Construction of the second unit, consisting of a 238-inch machine and including all the component mill equipment, an enlarged bleach plant, and two large boilers and turbines, was begun in March, 1946. Progress was slow, due principally to late delivery of equipment and the extension was not completed until March, 1948, two years after the start of construction, compared with a 10½ months' construction period required to complete the first comparable unit.

The second machine was brought into production on March 29, 1948, at about 900 f.p.m., but after a few months of service, the operators, skilled in the technique of handling pine fiber, were able to bring the machine up to a steady production speed of 1300 f.p.m. We plan to gradually step it up to at least 1500 f.p.m. after completing some machine adjustments.

The two units are now producing newsprint at an annual rate of 120,000 tons. This tonnage represents a little more than two percent of the newsprint consumed in the United States, so you can visualize the vast volume of total newsprint used by the daily and weekly newspapers in our country.

Further growth of the newsprint industry in the South is being undertaken at Childersburg, Alabama, where a two machine mill is now under construction by the Coosa River Paper Company. Time alone will tell what additional developments or expansions might be made in this industry to meet the economic conditions and business needs of the South.

The first unit at the Southland Paper Mills was a pioneering undertaking, confronted with many formidable problems, all of which were whipped by the perseverance of an indomitable staff. The original idea of a newsprint mill was conceived by a few industrial leaders but the ultimate execution of the project was made possible by the combined coordinated efforts of many hands, many hearts, and many minds.

Southland is now a successful well established industry and an outstanding example of what can be accomplished by industrious citizens under a free enterprise system so long as there is freedom in the land.

# A German Paper Museum

**By OTTO GOY**

***THIS ARTICLE is published here for its value in showing how the pulp and paper industry in Germany is meeting its postwar problems. It is not presented as a contribution to the advancement of the papermaking art.—Editor.***

In 1937 a sub-committee on The History of Paper Making and the Art of Watermarking was named by the Association of Pulp and Paper Chemists and Engineers. Its purpose was to investigate and set down in documentary form, the development of the paper industry from its earliest beginnings up to the present date. Chairman of the committee was Arnim Renker, a paper manufacturer, at Zerkall, near Duren. Mr. Renker was chosen for this post because of his active interest in this sphere for many years.

In the course of the foregoing development, the Research Institute of Paper History was founded in 1938. Alfred Schulte, a historian of the paper making art, was elected president of the institute. (Mr. Schulte was killed in combat in April of 1944, during World War II.)

Mainz was chosen as the Institute's headquarters because that city is the home of the Gutenberg Museum of the Printing Art, to which it was felt the Paper Museum should be annexed.

Completion of the Gutenberg Museum and of the Paper Museum was hindered by the war.

Before Mr. Schulte was called to arms he was successful in safely storing the Institute's files, specimens and data so that they came through the war unharmed and are now in the Municipal Library at Mainz.

The widow of Mr. Schulte, who collaborated with him in his work for many years, is managing the Research Institute of Paper History, pending appointment of a successor to Mr. Schulte.

Members of the pulp and paper industry have given financial support to the Institute and a number of them have agreed to pay it a fixed annual subsidy.

Activities of the Institute of Paper History include:

(1) Establishment of archives of watermarks for scientific investigation.

(2) Chronicling the history and development of past and present German paper mills.

(3) Collecting the whole literature of paper manufacture, paper history, watermarking and related subjects.

(4) Collecting technical details of paper making, both ancient and modern.

(5) Collecting specimens of new papers and paper products.

Incidental to the foregoing it is proposed to promote works of a paper historical character, present lectures on the development of paper manufacture, exhibit suitable material and maintain close connections with persons and organizations, both native and foreign, who are interested in or identified with paper making.

The Research Institute of Paper invites contributions of material of all kinds which might fit into the above program and will also accept financial contributions. Remittances for this purpose should be made payable to the account of Arnim Renker at the Mainzer Volksbank, Mainz, Germany.

FINLAND

DELIVERS HER

WOOD

PULP

MONTHLY

THROUGHOUT

THE YEAR

(NO CLOSED NAVIGATION)

PULP SALES

CORPORATION

230 Park Ave.

New York 17, N. Y.

Telephone: MUrray Hill 5-8764

# Trends

Office of the PAPER TRADE JOURNAL,
Wednesday, December 29, 1948.

What has been happening to the nation's business during the past months is drawing concentrated attention as the year ends. How to analyze the trend so that results may be realistic and of immediate value to business, yet stabilize national confidence, is proving a meaty bone for economists and politicians.

December forecast of the N.A.P.A. just released reports production declines greater than the increases by 3 to 1, that back-orders reflect a falling off and "declines more pronounced than would be caused by normal seasonal influences." Appraisals of immediate trends are said to be mixed, "but seem to fall about equally into three general groups of opinion. (1) The present softness is seasonal, over-emphasized by peak production and supply satisfying demand in many lines; that adjustments now being made will create a new balance in a short time, and that business will pick up after the first of the year, then be good for several months though somewhat lower than 1948. (2) That the trend is definitely down and will continue to recede until it reaches a competitive level — not a *bust*, but a gradual adjustment to lower levels of prices and production. (3) The short-range, hesitant attitude will continue until Congress meets and the Truman program is known and analyzed. Proposals on taxes, labor, laws and government spending will have considerable influence on plans, programs and, in general, business confidence. . . . Purchasing agents are unanimous in the conclusion that the situation calls for the utmost caution in commitment and inventory policies."

### Wood Pulp

Similarly divided opinion is reported within the trade, though generally it is felt that the overall picture is composed of all three aspects. Slow buying of wood pulp during the last quarter is largely attributed to over-heavy inventories at a time when prices showed signs of softening due to increased supply and decreased demand. Renewed buying can be expected now that first quarter prices are stabilized, it is stated in some circles, also that mills have already indicated a willingness to take quantities now. Considerable spot purchasing is anticipated as mills find themselves caught short of certain grades.

Further price adjustments in unbleached sulphite (U. S.) bring the price range to $118/125, full freight allowed, and to $118 for glassine grades, no freight allowed.

Soda and groundwood are firm at fourth quarter levels of $130/135 and $80/81 respectively. Spot offers of groundwood rumored at $75 lack confirmation. A softened undertone is indicated, however.

Announcement that three leading producers of Norwegian bleached sulphite have reduced their price to $140 from $165 per ADT, on dock Atlantic ports, is said to be meeting with favorable trade reaction.

Speaking for the Swedish situation, a leading Swedish trade journal writes that the situation remains vague. "The American customers have still certain quantities of pulp in stock and seem disinclined to buy more before more is known of the future prices. In view of raw material prices and high costs of production of the Scandinavian manufacturers, these can hardly reflect on the prices indicated by the buyers for deliveries in 1949. It seems increasingly clear that a lasting adaptation to the prices in the American home market can only be achieved by altering the dollar rate of exchange; but judging by recent official hints, no unilateral action on the part of Sweden seems at all likely in that respect.

### Economic Indicators

The Congressional Joint Committee on the Economic Report found the total gross national product in 3rd quarter more than 3 percent above the level of 1st half of year, chiefly as a result of price rises. The government surplus was greatly reduced as Federal receipts from personal income taxes declined . . . *November stock prices* dropped sharply from the October level and were near the level of January, 1948 . . . *Civilian employment* in November was slightly below 60 million. A seasonal decline in agricultural employment was partly offset by a seasonal increase in other employment. Unemployment, still under 2 million, was up a little. The Fall pick-up in employment in retail trade was largely offset by declines in nondurable manufacturing groups. Employment decreases in food processing were seasonal, while decreases in the shoe, leather and textile groups were contraseasonal . . . *Weekly hours* of *work* for manufacturing industries averaged 40 hours during October, a slight increase over the September averages, according to preliminary data . . . Despite a number of major work stoppages in October, the number of man-days lost was less than in September and substantially below levels for the spring.

### Production and Business

*Industrial production* increased somewhat in October as activity in durable goods industries reached a new post-war peak. Preliminary data for November indicate that production was maintained at about the October rate. Iron and steel production reached a new all-time high in October, about 3 percent above the wartime peak of October, 1943. Production of transporta-

*(Continued on page 50)*

# Imports

Week Ending Dec. 25

## NEW YORK

### Newsprint

Madden Reeve Angel & Co., Inc., Kregeholm, Kotka, 602 rolls.
Madden Reeve Angel & Co., Inc., Mormacoak, Kotka, 1246 rolls.
Madden Reeve Angel & Co., Inc., Hamina, Kotka, 1081 rolls.

### Printing Paper

F. L. Kramer & Co., American Flyer, London, 2 cs.

### Wallpaper

C. A. Haynes & Co., American Veteran, Manchester, 500 ctns., 14 cs. (patterns).
P. Blank, American Judge, Antwerp, 4 cs.
C. A. Haynes & Co., American Flyer, London, 157 ctns.
F. H. Karping, (Kansas City), Media, Liverpool, 51 cs.
C. A. Haynes & Co., Media, Liverpool, 214 ctns., 10 cs.
C. A. Haynes & Co., American Forwarder, Liverpool, 92 ctns.

### Surface Coated Paper

Gevaert Co. of America, Westerdam, Antwerp, 2 cs.
Gevaert Co. of America, Averdyk, Antwerp, 9 cs.

### Paperhangings

C. A. Haynes & Co., American Leader, London, 11 bls., 1 cs.

### Filter Paper

H. Reeve Angel & Co., Inc., American Flyer, London, 33 cs.
Stevens Nelson Paper Corp., American Flyer, London, 1 cs.
H. Reeve Angel & Co., Inc., Media, Liverpool, 14 cs.
E. Fougera & Co., American Merchant, Bordeaux, 7 cs., 30 bls.

### Tracing Cloth

Keuffel & Esser Co., American Veteran, Manchester, 19 cs. (cotton).

### Drawing Paper

H. Reeve Angel & Co., Inc., American Flyer, London, 6 cs.
Stevens Nelson Paper Corp., American Leader, London, 5 cs. (handmade).
A. Brown Bros., American Leader, London, 3 cs.
Winsor Newton, Inc., American Leader, London, 3 cs.
H. Reeve Angel & Co., Inc., Media, Liverpool, 3 cs.

### Gummed Paper

B. F. Drakenfeld & Co., Media, Liverpool, 86 cs.

### Boxboard

National City Bank, Hamina, Rauma, 118 rolls.

### Envelopes & Paper

Stevens Nelson Paper Corp., American Leader, London, 4 cs. (envelopes).
Neimann Marcus & Co., (Dallas, Texas), America, Havre, 5 cs.

### Tissue Paper

B. F. Krakenfeld & Co., Liverpool, 16 cs. (pottery).
B. F. Drakenfeld & Co., American Forwarder, 4 cs.

### Serviettes

Freund Mayer, Queen Mary, Southampton, 4 cs.
(———), Media, Liverpool, 10 cs., 3 crates.

### Photo Paper

American Express Co., American Leader, London, 124 drums (base).

### Wrapping Paper

Public National Bank Trust Co., Mormacoak, Gothenburg, 83 rolls.
S. B. Behrens Co., Inc., Mormacoak, Gothenburg, 490 rolls.

### Sulphite Paper

Nils Troedsson, Inc., Mormacoak, Gothenburg, 211 rolls.

### Miscellaneous Paper

F. Henjes Jr., Mormacoak, Gothenburg, 7 ctns. (samples).

### Rags, Baggings, etc.

Williamson Northrup Co., Mormacrio, Santos, 66 bls. cotton waste.
Chase National Bank, Media, Liverpool, 7 bls. new wool rags, 34 bls. wool thread waste.
Chemical Bank Trust Co., Sonnavind, Alexandria, 124 bls. old bagging.
National City Bank, Sonnavind, Alexandria, 72 bls. heavy burlap bagging, 98 bls. old hessian bagging, 247 bls. bagging.
(———), Sonnavind, Alexandria, 78 bls. old cotton rags.
Chase National Bank, American Forwarder, Manchester, 5 bls. wool rags, 7 bls. wool waste.
Castle & Overton, Inc., American Forwarder, Glasgow, 116 bls. grey linen thread waste.
Chase National Bank, Averdyk, Rotterdam, 122 bls. rags.
Midwest Waste Material Co., Averdyk, Antwerp, 140 bls. jute waste.
National City Bank, Hellenic Wave, Genoa, 138 bls. old bagging.
H. Adlerstein, Exochorda, Genoa, 75 bls. old jute bagging.
Railway Supply & Manufacturing Co., Marine Flier, Cochin, 200 bls. old jute rags.
(———), Marine Flier, Bombay, 80 bls. old jute rags.
Buffalo Batt & Felt Corp., Marine Flier, Bombay, 143 bls. cotton waste.
Brandwein Mazur Co., Marine Flier, Bombay, 200 bls. cotton waste.
C. Comiter, Marine Flier, Bombay, 250 bls. cotton waste.
Railway Supply & Manufacturing Co., Marine Flier, Bombay, 150 bls. cotton waste.
New England Waste Co., Marine Flier, Genoa, 99 bls. cotton waste.
H. Adlerstein, Giovanna C., Genoa, 31 bls. old jute rags.
Chemical Bank Trust Co., Fernfield, Shanghai, 450 bls. cotton waste.
Chase National Bank, American Veteran, Manchester, 94 bls. old waste bagging.
J. Block & Co., Inc., American Veteran, Manchester, 31 bls. new colored hosiery cuttings.
(———), American Veteran, Glasgow, 56 bls. linen waste.
Kauders Steuber Co., Socrates, Leningrad, 3202 bls. cotton linters, 3091 bls. cotton waste.
Amtorg Trading Corp., Socrates, Leningrad, 260 bls. rags.

## EASTERN DISTRICT MGR.

J. C. Dabney, now district manager of the Eastern district of the Harris, Seybold, Potter Co., in charge of sales and service in the 12 states from Maine to Virginia.

### Old Rope

(———), Markor, Calcutta, 190 bls. rope cuttings.

### Casein

Hercules Powder Co., Hornero, Buenos Aires, 1667 bags, 100020 kilos.

### Hidecuttings

John Gorvers, Santa Luisa, Callao, 43 bls.
Karr Ellis Co., Media, Liverpool, 560 bags.
John Gorvers, Cape Cod, Barranquilla, 364 rolls.

### Woodpulp

Gottesman & Co., Inc., Ellin Horn, Trieste, 11068 bls.

### Woodpulp Boards

Jay Madden Corp., Krageholm, Kotka, 363 bls., 1 roll.

## NEWARK

National City Bank, Hamina, Rauma, 4994 bls. prime bleached sulphite pulp.
Pulp Sales Corp., Hamina, Kotka, 734 bls. prime unbleached extra strong sulphite pulp, 1375 bls. prime unbleached sulphite pulp, 1015 bls. prime unbleached kraft sulphate pulp.

## PHILADELPHIA

Pulp Sales Corp., Krageholm, Jacobstad, 802 bls. prime unbleached sulphate pulp, 300 bls. prime unbleached kraft sulphite pulp, 515 bls. prime kraft pulp.
(———), Krageholm, Abo, 322 rolls wrapping paper.
Pulp Sales Corp., Krageholm, Kotka, 510 bls. prime unbleached sulphate pulp, 762 bls. white dry mechanically ground woodpulp.
Madden Reeve Angel & Co., Inc., Krageholm, Kotka, 672 rolls newsprint.
Jay Madden Corp., Krageholm, Helsingfors, 102 rolls wrapping paper.
(———), Kirsten, Buenos Aires, 1000 bags casein.
Pulp Sales Corp., Mormacoak, Helsingfors, 254 bls. white dry mechanically ground woodpulp, 50 tons.
Pulp Sales Corp., Mormacoak, Kotka, 3302 bls. white dry mechanically ground woodpulp, 660 tons.
Elof Hansson, Inc., Mormacoak, Gothenburg, 3000 bls. woodpulp, 508 tons.
National City Bank, Hellenic Wave, Genoa, 111 bls. old bagging.
National City Bank, Exford, Genoa, 71 bls. old bagging.

## BALTIMORE

Pulp Sales Corp., Mormacoak, Kotka, 1778 bls. white dry mechanically ground woodpulp, 304 tons.
Madden Reeve Angel & Co., Inc., Mormacoak, Kotka, 754 rolls newsprint.
Pulp Sales Corp., Krageholm, Kotka, 977 bls. prime unbleached sulphate pulp, 1778 bls. white dry mechanically ground woodpulp.
Madden Reeve Angel & Co., Inc., Krageholm, Kotka, 862 rolls newsprint.
Pulp Sales Corp., Krageholm, Jacobstad, 1090 bls. prime strong unbleached pulp.

## NORFOLK

F. P. Gaskell & Co., American Forwarder, Glasgow, 132 cs. coated paper (for cigarette tips).
Durham Herald Co., (Durham, N. C.), Averdyk, Rotterdam, 84 rolls newsprint.
News & Observer Publishing Co. (Raleigh, N. C.), Averdyk, Rotterdam, 111 rolls newsprint.
Greenville News Piedmont, (Greenville, S. C.), Averdyk, Antwerp, 396 rolls newsprint.
F. P. Gaskell Co., American Veteran, Glasgow, 45 cs. coated paper (for cigarette tips).

## LOS ANGELES

Bank of The Manhattan Co., Marine Flier, Genoa, 100 bls. old jute rags.

# Prices

**Quotations indicate trends in an open market. At the moment they can be of little more value. While some volume business still is done under contract at the figures shown, fluctuations are too varied and frequent to permit prices to be interpreted as representing a wholly stabilized market.**

## NEW YORK

### Paper

(Delivered)

| | | |
|---|---|---|
| Standard News, per ton— | | |
| Rolls, contract | $100.00/ | — |
| Sheets | 115.00/ | — |
| Kraft—per cwt.—Carload Quantities. Zone 1, 40 lb. base wgt. | | |
| No. 1 Wrapping | $7.75/ | $8.00 |
| Superstandard Wrapping | 9.00/ | — |
| Standard Wrapping Rolls | 7.00/ | — |
| Standard Wrapping Sheets | 7.50/ | — |
| Standard Bag | 6.50/ | — |
| Tissues—Per Ream 24x36 (480) 10/11 lbs. Zone 1. | | |
| Wh. No. 1 Frd.* | $1.84/ | $2.00 |
| Wh. No. 1 M. G. | 1.94/ | 2.00 |
| Wh. No. 1½ | 1.65/ | — |
| Wh. No. 2 | 1.50/ | 1.60 |
| Kraft Anti-Tar | 1.65/ | — |
| Kraft Unbl. | 1.85/ | — |
| Shred. Wh. No. 1 per lb. | .12¾/ | .18 |
| Toilet—Per Case of 100 rolls—1 M Sheets. | | |
| Unbleached | $7.50/ | — |
| Bleached | 8.75/ | 10.00 |
| Paper Towels—Per Case of 3750—Zone 1. | | |
| Wh. Jr. M'tif'd 9¼x9½ | $5.45 | |
| Br. Sr. M'tif'd 10x12 | 3.80 | |
| Br. Jr. M'tif'd 9½x9¾ | 3.30 | |
| Br. Jr. Sgl. fold 10x10¾ | 3.35 | |
| Manila—per cwt.—C-1 f.a. | | |
| No. 1 Jute Tag | $14.50/ | — |
| Reg. Jute Manila | 13.50/ | $15.50 |
| No. 1 Manila Wrapping | 8.75/ | 10.50 |
| 5 lb. Manila | 10.75/ | 11.25 |
| Boards, per ton— | | |
| Filled News | 94.00/ | |
| Plain Chip | 85.00/ | 90.00 |
| Blchd. Mla. L-d. Chip* | 105.00/ | |
| White Pat. coated* | 120.00/ | |
| Kraft Liners 42 lb. | 105.00/ | |
| Kraft Corr. .009 | 110.00/ | |
| Binders Boards | 120.00/ | 126.00 |

* Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following prices are representative of distributors' resale prices, all deliveries in Zone 1:

Rag Content Bonds and Ledgers—
White, 16 lb.

Bonds, per cwt.

| | Carton | 4 C't'n | Ton |
|---|---|---|---|
| 100% Rag Ext. No. 1 | $59.00 | $54.55 | $52.30 |
| 100% Rag | 50.25 | 46.40 | 44.50 |
| 75% Rag | 41.50 | 38.30 | 36.70 |
| 50% Rag | 33.75 | 30.70 | 29.50 |
| 25% Rag | 30.25 | 27.45 | 26.35 |

Ledgers, per cwt.

| | | | |
|---|---|---|---|
| 100% Rag Ext. No. 1 | $57.00 | $52.65 | $50.50 |
| 100% Rag | 50.25 | 46.40 | 44.50 |
| 75% Rag | 41.50 | 38.30 | 36.70 |
| 50% Rag | 33.75 | 30.70 | 29.50 |
| 25% Rag | 30.25 | 27.45 | 26.35 |

Sulphite Bonds and Ledgers—
White, 16 lbs.

Bonds, per cwt.

| | | | |
|---|---|---|---|
| No. 1 | $21.25 | $19.25 | $18.50 |
| No. 2 | 20.25 | 18.30 | 17.55 |
| No. 4 | 19.25 | 17.55 | 16.85 |

Ledgers, per cwt.

| | | | |
|---|---|---|---|
| No. 1 | $21.75 | $19.65 | $18.85 |
| No. 2 | 20.75 | 18.75 | 18.05 |
| No. 4 | 20.00 | 18.10 | 17.35 |

White Book, per cwt.—

| | Case | Ton |
|---|---|---|
| Coated | | |
| No. 1 Glossy | $20.90 | $20.15 |
| No. 2 Glossy | 19.65 | 18.90 |
| No. 3 Glossy | 18.90 | 18.25 |
| Machine Coated | 16.65 to 17.15 | 16.05 to 16.35 |
| Uncoated | | |
| No. 1 Antique (Watermarked) | 16.40 | 15.80 |
| Offset | 15.15 to 17.15 | 14.60 to 16.40 |
| A Grade E. F. | 15.40 | 14.85 |
| A Grade S. C. | 15.90 | 15.35 |
| B Grade E. F. | 15.15 | 14.55 |
| B Grade S. C. | 15.65 | 14.95 |

### New Domestic Cotton Cuttings

(Prices to Mill, F.o.b. Ship. Pt.)

| | | |
|---|---|---|
| White Shirt | $10.00/ | $10.50 |
| Unbleached Muslin | 10.50/ | 11.50 |
| Light Silesias | 7.75/ | 8.00 |
| White Back Blue Overalls | 6.25/ | 6.75 |
| Blue Overalls | 6.00/ | 6.50 |
| Fancy Shirt | 5.00/ | 5.50 |
| Percales | 6.25/ | 6.50 |
| Light Prints | 6.50/ | 6.75 |
| No. 1 Washables | 4.00/ | 4.50 |
| Bleachable Khaki | 5.50/ | 5.75 |
| Unbleachable Khaki | 5.00/ | 5.50 |
| Cottonades | 4.75/ | 5.25 |
| Lt. Flannelettes | 7.50/ | 8.00 |
| Men's Corduroy | 4.25/ | 4.50 |
| Women's Corduroy | 4.00/ | 4.25 |

### Old Domestic Cotton Rags

(Prices to Mill, F.o.b. Ship. Pt.)

| | Per 100 lbs. | |
|---|---|---|
| No. 1 Whites, Repacked | $5.00/ | $5.50 |
| No. 1 Whites, Miscellaneous | 4.00/ | 4.50 |
| No. 2 Whites, Repacked | 3.00/ | 3.50 |
| No. 2 Whites, Miscellaneous | 2.50/ | 2.75 |
| Blue Overalls | 3.50/ | 4.00 |
| Thirds and Blues, Repacked | 2.25/ | 2.75 |
| No. 1 Roofing Rags | 1.40/ | 1.50 |
| No. 2 Roofing Rags | 1.25/ | 1.35 |
| No. 3 Jute Bagging | 1.15/ | 1.25 |
| No. 4 Brussels & hrd. Bck'd crpts. | 1.25/ | 1.35 |
| No. 5A Roofing Rags | 1.25/ | 1.35 |

### New Foreign Cotton Cuttings

(Prices to Mill, F.o.b. Dock, N. Y.)

| | Per 100 lbs. | |
|---|---|---|
| New Dark Cuttings | $5.50/ | $5.75 |
| New Mixed Cuttings | 6.25/ | 6.50 |
| Light Silesias | 9.25/ | 9.50 |
| Light Flannelettes | 9.25/ | 9.50 |
| New White Cuttings | 12.00/ | 13.00 |
| New Unbleached Cuttings | 12.25/ | 13.00 |
| Fancy Shirt Cuttings | 6.50/ | 7.00 |
| Light Prints | 7.75/ | 8.00 |
| Bleachable Khaki, No. 1 | 7.00/ | 7.50 |
| Unbl. Khaki, No. 1 | 6.25/ | 6.75 |

### Old Foreign Rags

(Prices to Mill, F.o.b. Dock, N. Y.)

| | Per 100 lbs. | |
|---|---|---|
| No. 1 White Cottons | — | / — |
| No. 2 White Cottons | — | / — |
| No. 3 White Cottons | — | / — |
| No. 4 White Cottons | 3.50/ | 3.75 |
| Extra Light Prints | 6.50/ | 7.00 |
| Old Light Prints | 4.50/ | 5.00 |
| Med. Light Prints | 4.00/ | 4.50 |
| Dutch Blue Cottons | 5.25/ | 5.50 |
| Checks and Blues | 3.25/ | 3.50 |
| Linsey Garments | 2.15/ | 2.25 |
| Dark Cottons, European | 2.00/ | 2.10 |
| Dark Cottons, Egyptian | 1.90/ | 2.00 |
| Old Shopperies | nominal | |
| New Shopperies | nominal | |

### Bagging

(Prices to Mill, f.o.b. N. Y.)

| | Per 100 lbs. | |
|---|---|---|
| Foreign Gunny, No. 1 | $8.00/ | $8.50 |
| Domestic Gunny, No. 1 | 7.50/ | 8.50 |
| Heavy Wool Tares | 7.50/ | 7.75 |
| No. 1 Scrap Bagging | 7.25/ | 7.50 |
| Roofing Bagging | 1.10/ | 1.20 |
| Foreign Manila Rope | 5.50/ | 5.75 |
| Domestic Manila Rope | 6.00/ | 6.25 |
| Jute Strings | 7.00/ | 7.25 |
| No. 1 Sisal Strings | 5.25/ | 5.50 |
| Mixed Strings | 1.50/ | 1.75 |

### Waste Paper

Base Prices to Mills for Average Packings
F.o.b. New York, Baled

| | (Per Ton) | |
|---|---|---|
| No. 1 Hard White Envelope Cuts | 95.00/ | 100.00 |
| No. 1 Hd. Wh. Shavings, unruled | 80.00/ | 85.00 |
| Super Soft White Shavings | 80.00/ | 85.00 |
| No. 1 Soft White Shavings | 60.00/ | 65.00 |
| No. 1 Fly Leaf Shavings | 40.00/ | — |
| No. 1 Gd'wd Fly Leaf Shavings. | 30.00/ | 35.00 |
| No. 1 Heavy Books & Magazines | 19.00/ | 21.00 |
| Mixed Books | 13.00/ | 15.00 |
| No. 1 White Ledger | 45.00/ | 50.00 |
| Col. Ledger | 35.00/ | 40.00 |
| Manila Tab. Cards | 50.00/ | 55.00 |
| New Manila Envelope Cuttings | 60.00/ | 65.00 |
| Extra Manilas | 20.00/ | 25.00 |
| Mxd. Kraft, Bag Cuttings | 45.00/ | 55.00 |
| Kraft Envelope Cuttings | 55.00/ | 65.00 |
| Triple Sorted, No. 1 Brown Soft Kraft | 35.00/ | 40.00 |
| New Kraft Corrugated Cuttings | 30.00/ | 35.00 |
| No. 1 Assorted Old Kraft | 30.00/ | 35.00 |
| Used Kraft Bags | 30.00/ | 35.00 |
| New Jute Corrugated Cuttings | 18.00/ | — |
| Old Corrugated | 14.00/ | 15.00 |
| No. 1 News | 13.00/ | 14.00 |
| No. 1 Mixed Papers | 6.00/ | 7.00 |
| Box Board Cuttings | 7.00/ | 8.00 |
| White Blank News | 60.00/ | 65.00 |
| Overissue News | 17.00/ | 18.00 |
| Sulphite Mill Wrappers | 12.00/ | 14.00 |

### Twines

All Prices Nominal, F.o.b. Mill

| | | |
|---|---|---|
| (Soft Fiber) | | |
| Coarse Polished—India | .35½/ | .36½ |
| Fine Polished India | .41½/ | .45 |
| Unpolished—Paper Makers | .32¾/ | .34½ |
| Tube Rope | .33¾/ | .35½ |
| Wrapping | .36 / | .38¾ |
| Cotton | .58 / | .60 |
| Polished Cotton | .55 / | — |
| (Hard Fiber) | | |
| Mex. Sisal | .21 / | .27 |
| Manila (Reprocessed) | .31 / | .35 |
| (American Hemp) | | |
| Polished Hemp | .46½/ | .48 |
| Unpolished | .35 / | .37¾ |

## PHILADELPHIA

### Domestic Rags (new)

(F.o.b. Eastern Shipping Point)

| | | |
|---|---|---|
| White Shirt | .10½/ | .11 |
| Light Silesias | .07½/ | .08 |
| Black Silesias, soft | .05½/ | .06 |
| Unbleached Muslin | .10½/ | .11¼ |
| Washable Prints | .06½/ | .07 |
| Washable No. 1 | .05 / | .05½ |
| Blue Overall | .07½/ | .08 |
| Washable Shredding | .02¾/ | .03¼ |
| Fancy Percales | .06¾/ | .07¼ |
| Unbleachable Khaki | .05½/ | .06½ |
| Bleachable Khaki | .06¼/ | .06¾ |
| Men's Corduroy | .05½/ | .06 |
| Ladies' Corduroy | .05 / | .05½ |
| Cottonades | .05½/ | .06 |

### Domestic Rags (Old)

(F.o.b. Eastern Shipping Point)

| | | |
|---|---|---|
| White No. 1—Repacked | 4.50 / | 5.00 |
| Mixed White | 4.00 / | 4.25 |
| White No. 2—Repacked | 3.50 / | 3.75 |
| Thirds and Blues— | | |
| Miscellaneous | 2.50 / | 2.75 |
| Repacked | 3.00 / | 3.25 |
| Domestic No. 1 Roofing Stock | 1.55 / | 1.60 |
| Domestic No. 2 Roofing Stock | 1.45 / | 1.50 |
| Roofing Bagging | 1.35 / | 1.40 |
| Old Manila Rope | — / | 5.50 |

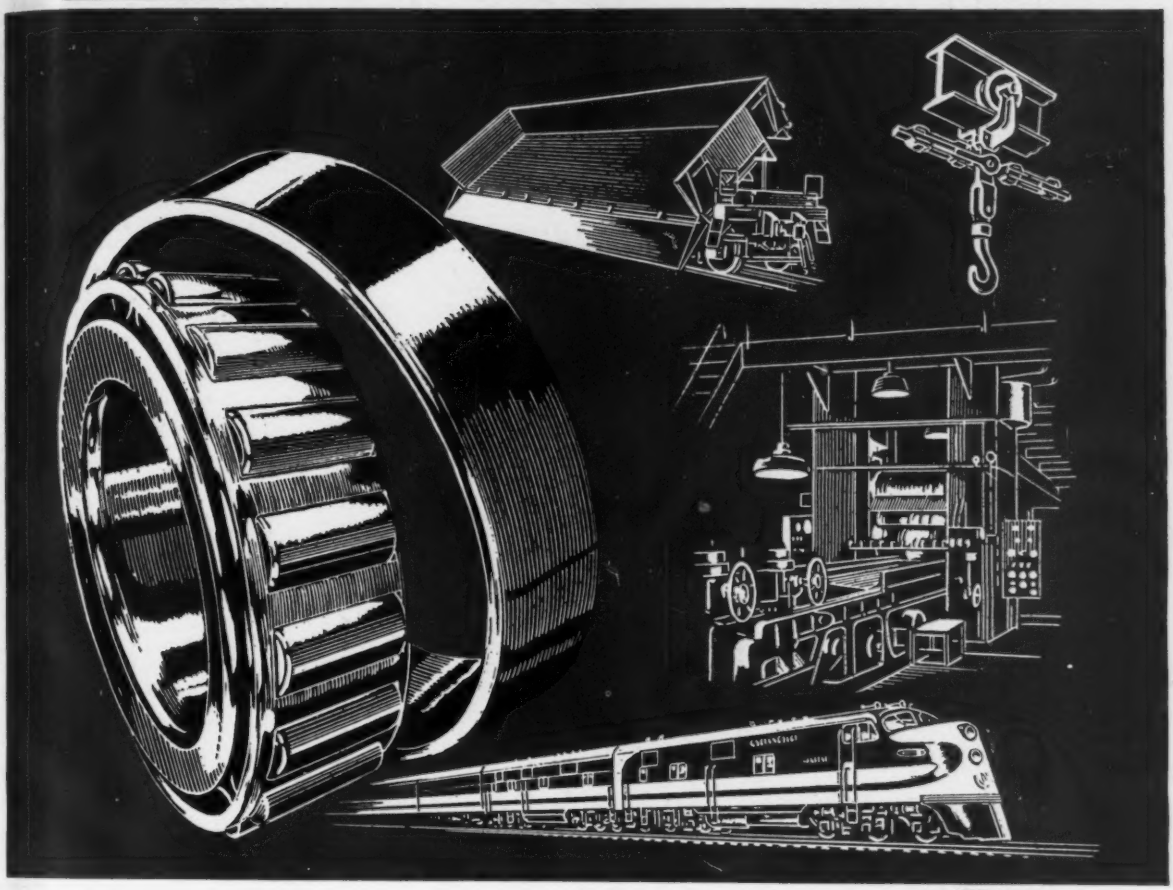
(Continued on page 32)

## World Wood Pulp Markets at a Glance

### First Quarter Contract Prices, Per Short Air-Dry Ton

| | Delivered, with varying freight allowances | | On dock Atlantic Ports | | |
|---|---|---|---|---|---|
| | U. S. | Canadian | Swedish | Finnish | Norwegian |
| Groundwood | $80.00/$81.00 | $80.00/$81.00 | | | |
| Siderums Pulping News | | 80.00/ 90.00 | | | |
| Soda, Bleached | 130.00/135.00 | 130.00/ — | | | |
| Sulphate, Bleached | 136.00/145.00 | 147.50/150.00 | $150.00/ — | | |
| Sulphate, Unbl'd North'n | 120.00/125.00 | 115.00/125.00 | 127.50/ — | 127.50/ — | |
| Sulphate, Unbl'd South'n | 105.00/115.00 | | | | |
| Sulphite, Blchd. (S'ftw'd) | 126.00/135.00 | 135.00/ — | 140.00/165.00 | 165.00/ — | 140.00/165.00 |
| Sulphite, Blchd. (H'dw'd) | 125.00/145.00 | | | | |
| Sulphite, Unbleached | 118.00/ — | 125.00/ — | 140.00/149.00 | 140.00/143.00 | |
| Sulphite, Unbl'd (Glossine) (no freight allowed) | 120.00/ — | 125.00/130.00 118.00/ — | | | |

# YES! Tycol Acylkup Greases perform better... BETTER... BETTER



**Tycol Acylkup Greases perform better because:**

... *Tycol Acylkup Greases* are made from finest quality cylinder stocks and refined neutral oils, combined with a minimum of soap.

... *Tycol Acylkup Greases* are engineered to take it. They assure maximum performance.

... *Tycol Acylkup Greases* keep bearings smooth running and cool.

... *Tycol Acylkup Greases* supply the "film of protection" needed to give power a chance to produce.

Complete information on Tycol Acylkup Greases is available from your nearest Tide Water Associated Office. Write, wire, or phone today.

TYCOL
INDUSTRIAL LUBRICANTS

**Boston • Charlotte, N. C.**
**Pittsburgh • Philadelphia**
**Chicago • Detroit • Tulsa**
**Cleveland • San Francisco**

TIDE WATER ASSOCIATED OIL COMPANY
17 BATTERY PLACE - NEW YORK 4, N.Y.

**LUBRICATION—"ENGINEERED TO FIT THE JOB"**

# Prices

CONTINUED FROM PAGE 30

### Bagging

(F.o.b. Eastern Shipping Point)

| | |
|---|---|
| Foreign Gunny No. 1 | nominal |
| Domestic Gunny No. 1 | .07¼/ .07¾ |
| Sisal Strings No. 1 | .04½/ .05 |
| Sisal Strings No. 2 | .03½/ .04 |
| Sisal Jute | .02¼/ .03 |
| No. 1 Scrap | .06½/ .07 |
| No. 2 Scrap | .03 / .03½ |

### Waste Papers

F.o.b. Phila. Mill Prices, Baled

| | Per Ton |
|---|---|
| No. 1 Hd. White Envelope Cuts.. | 95.00/ 100.00 |
| No. 1 Hd. Wh. Shavings, unruled | 85.00/ 90.00 |
| Soft White Shavings | 65.00/ 70.00 |
| White Blank News | 65.00/ 75.00 |
| No. 1 White Ledger | 50.00/ 55.00 |
| No. 1 Heavy Books & Magazines | 20.00/ 22.00 |
| New Manila Envelope Cuttings.. | 70.00/ 75.00 |
| No. 1 Assorted Old Kraft | 30.00/ — |
| No. 1 Mixed Paper | 7.00/ 8.00 |
| Box Board Cuttings | 8.00/ 10.00 |
| New Kraft Corrugated Cuttings.. | 35.00/ 40.00 |
| Old Corrugated | 12.00/ 15.00 |
| Overissue News | 15.00/ 16.00 |
| No. 1 News | 11.00/ 13.00 |

## BOSTON

### Waste Papers

F.o.b. Boston, Mill Prices, Baled

| | Per Ton |
|---|---|
| No. 1 Hd. Wh. Shav., unruled..$ | — / $90.00 |
| Soft White Shavings | — / 70.00 |
| No. 1 Fly Leaf Shavings | — / 30.00 |
| Mixed Colored Shavings | 25.00/ — |
| New Manila Env. Cuts, one cut.. | — / 65.00 |
| Hard White Envelope Cuts, one cut | — / 100.00 |
| Triple S'ted No. 1 Br. Soft Kraft | — / 45.00 |
| Kraft Envelope Cuttings | 70.00/ 75.00 |
| No. 1 Heavy Books & Magazines | — / 18.00 |
| New Manila Envelope Cuttings.. | — / 65.00 |
| White Tabulating Cards | — / 70.00 |
| White Blank News | — / 62.50 |
| No. 1 Mixed Paper | 9.00/ — |
| Overissue News | 15.00/ — |
| No. 1 News | 11.00/ 12.00 |
| New Corrugated Cuttings, Kraft | — / 40.00 |
| Old Corrugated Containers | 13.00/ 14.00 |

### Bagging

(F.o.b. Boston)

(Per 100 lbs.)

| | |
|---|---|
| Foreign Gunny | nominal |
| Domestic Gunny | 9.00 / — |
| Domestic No. 1 Old Rope | 6.00 / 6.50 |
| Foreign No. 1 Old Rope | 5.75 / 6.00 |
| Mixed Strings | 1.35 / — |
| Transmission Rope— | |
| Domestic | 3.00 / — |
| Jute Carpet Threads | — / 4.00 |
| Bleachery Burlap | — / 9.00 |
| Scrap Burlap— | |
| Foreign | 6.75 / 7.00 |
| Domestic | 8.25 / 8.50 |
| South America | 8.25 / 8.50 |
| Austr. Wool Pouches | 8.00 / — |
| New Zealand Wool Pouches | 8.00 / — |
| New Burlap Cuttings | 8.50 / — |
| Heavy Baling Bagging | 8.00 / 8.50 |
| Paper Mill Bagging | 8.00 / — |
| No. 1 Roofing Bagging | — / 1.40 |

### Domestic Rags (New)

(F.o.b. Boston)

(Per 100 lbs.)

| | |
|---|---|
| New Light Prints | nominal |
| Fancy Percales | 7.00 / — |
| White No. 1 Shirt | 11.00 /11.50 |
| Light Flannelettes | 8.00 / — |
| Canton Flannels, Bleached | 10.00 / — |
| Underwear Cutters, Bleached | 10.50 /11.00 |
| Underwear Cutters, Unbleached | 10.50 /11.00 |
| Silesias No. 1 | 7.25 / 8.00 |
| Blue Overalls | 7.75 / 8.00 |
| Soft Unbleached | 11.00 /11.50 |
| Blue Cheviots | 7.75 / 8.00 |
| Fancy | 5.50 / — |
| Washable | 6.00 / — |
| Khaki Cuttings | 6.00 / — |
| Corduroy | 4.00 / — |
| Men's Corduroy | 4.50 / — |
| Khaki Canvas | — / 6.00 |
| B. V. D. Cuttings | 11.00 / — |

### Domestic Rags (Old)

(F.o.b Boston)

| | Per 100 lbs. |
|---|---|
| No. 1 Whites, Repacked | $4.25 /$4.50 |
| No. 1 Whites, Miscellaneous | 3.00 / 3.75 |
| Twos and Blues, Repacked | 2.50 / 3.00 |
| Old Blue Overalls | 3.00 / 3.25 |
| No. 1 Roofing Stock | — / 1.45 |
| No. 2 Roofing Stock | — / 1.35 |
| No. 3 Roofing Stock | — / .90 |
| No. 4 Roofing Stock | — / .90 |
| No. 5, Quality A. | — / 1.20 |
| Old Manila Rope | 6.00 / — |

## CHICAGO

### Waste Paper

(F.o.b. Chicago) Mill Prices, Baled

| Shavings— | Dec. 1 |
|---|---|
| No. 1 Hard White Envelope cuts, one cut | $100.00/ — |
| No. 1 Hard White Shavings, unruled | 90.00/ — |
| No. 1 Soft White Shavings | 50.00/ 55.00 |
| No. 1 White Ledger | 30.00/ — |
| No. 1 Heavy Books & Magazines | 28.00/ 30.00 |
| White Blank News | 45.00/ — |
| Mixed Kraft Env. & Bag Cuttings | 70.00/ — |
| No. 1 Assorted Old Kraft | 20.00/ — |
| Overissue News | 18.00/ — |
| No. 1 News | — / 15.00 |
| No. 1 Mixed Paper | 8.00/ — |
| Old Corrugated | 14.00/ — |
| Mill Wrappers | 11.00/ — |

# Markets

### Blanc Fixe

Demand steady. Dry direct process supply good. Currently quoted at $85.00 in bags, car lots at works, 6 cents per pound, l.c.l., deld. By-product supply somewhat restricted. Quoted at $77.50 per ton, car lots, at works, 6 cents per pound, l.c.l., deld.

### Bleaching Powder

Prices unchanged. Demand continues good. Supply adequate. Prices range from $4.25 to $4.75 per 100 pound drums, l.c.l.,works.

### Casein

Buying duel. Argentine export tax to up price by 1½ cents. Foreign inquiry now firms price. Current prices on processed acid precipitated casein at 28 to 32 cents per pound for domestic grades and 25½ to 27 cents for imported grades, f.o.b. shipping point.

### Caustic Soda

Liquid types in good supply. Flaked and solid improving but still tight. Solid caustic is reported at $3.10/$3.20 per cwt. flaked and ground is quoted at $3.50 per cwt., in 400 pound drums, $4 to $4.45 per cwt. in 100 pound drums —car lots at works; liquid 50 percent in tank cars at $2.50 per cwt.; liquid 73 percent in tank cars at $2.60 per cwt., at works.

### China Clay

Supply ample. Demand steady. Domestic filler quoted at $10 to $12.50 per ton, car lots, f.o.b. mines. Coating clay is $15 to $25. Imported clay quotation, short tons, $16 to $35, export warehouse.

### Chlorine

Supply tightened by increased demand. Shortage of tankcars and multi-unit containers hampers delivery. Currently quoted at $2.40 per cwt. in single unit tank cars; at $2.70 to $3.90 per cwt., in multi-tank cars, f.o.b., works.

### Rosin

Gum rosin, paper grades, reduced 7c. Savannah and local markets unchanged. Demand easy. Export activity reported. Gum rosin in drums per 100 pounds net in car lots, f.o.b., Savannah; B, $6.51; G, H, I, K, $7.65. Wood rosin per 100 pounds net, car lots, f.o.b. Savannah; B, $5.00; FF, $6.50.

### Rosin Size

Heavy demand. Supply good. Seventy percent gum and pale wood grades, tank cars, $6.30 to $6.40, f.o.b. southern shipping point.

### Salt Cake

Supply good. More efficient use has cut industry needs. Prices steady. Domestic salt cake quoted at $27.00, f.o.b. shipping point, freight allowed to destination.

### Soda Ash

Delivery good. Increased production and eased demand from other industries makes supply condition favorable. Current prices, car lots per 100 pounds; in bulk, $1.15; in paper bags, $1.40; and in barrels, $1.90.

### Sodium Bicarbonate

Production good. Demand eased by better supply of other alkalis. Reported as $1.95 per cwt. paper bags, carload lots.

### Starch, Corn

Demand moderate. Supply ample. Prices firm parelleling corn markets. Pearl grade quoted at $4.82 per 100 pounds; powdered starch at $4.93 per 100 pounds; car lots, f.o.b. Chicago.

### Starch, Potato

Demand improved. Prices stronger though largely nominal. Supply ample. High grade quoted at $4.80/$5.00 cwt. f.o.b. Idaho; $5.10/$5.25 f.o.b. Maine; Pearl grade, $5.00/$5.15 cwt. f.o.b. Maine.

### Sulphate of Alumina

Supply good. Price steady. The commercial grades are quoted from $1.50 per 100 pounds, in bags, car lots, f.o.b. works. Iron free is $2.50 per 100 pounds in bags, car lots, at works.

### Sulphur

Supply and demand good. Annual contracts are quoted at $18 per long ton, f.o.b. mines; export price f.o.b. at Gulf ports is $22.00 per long ton.

### Talc

Demand continues in excess of supply. Improvement seen by early 1949. Prices steady. Domestic grades are currently quoted at $23 per ton in paper sacks, f.o.b. mills; Canadian at $35 and up per ton. All prices in car lots.

### Tapioca Flour

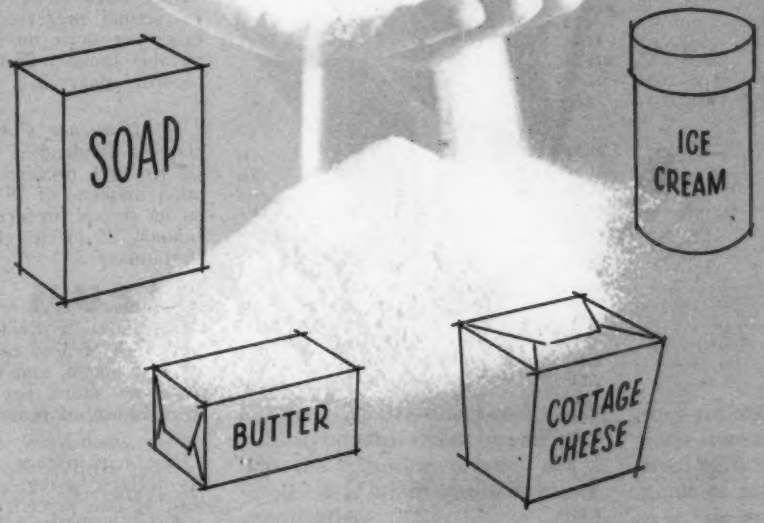
Market quiet. High grades in fair supply. Superior high range from $10.25/$11.50 cwt.; high grades $9.25 cwt., on dock Atlantic and Gulf ports; medium grades range from $6.00/$7.50 cwt. on dock, N. Y. Coarse pearl grades, $5.00/$5.50 cwt. on dock N. Y. Medium and low grades in adequate supply.

### Titanium Dioxide

Prices advance 1½ cents, actual freight allowed. Supply of paper grades continues unequal to demand. Shipments on allocation. Improvement in supply delayed to 1951. Anastase 19½c pound carload lots, 20c l.c.l., rutile, 21½c pound carload lots, 22½c l.c.l.; 50-pound bags, f.o.b. plant, actual freight allowed.

# in paper and paperboard coatings

# the trend is to HERCULES CMC




Steadily increasing commercial applications and continuing mill trials demonstrate that calender-applied Hercules* CMC produces 5 to 20 per cent increases in Mullen and tensile strength on paper and board.

Effective grease resistance also can be obtained with Hercules CMC, using calender boxes and size press. In most cases, calender-applied CMC achieves sufficient grease resistance for high quality gloss ink printing and/or substantial wax savings.

Hercules CMC, cellulose gum, is a white, free-flowing, water soluble, granular powder, available in a wide range of viscosities. It is supplied in 100 lb. fiber drums and 50 lb. bags. For technical details and prices, write:

## HERCULES

SIZING MATERIALS AND CHEMICALS FOR PAPER

*HERCULES POWDER COMPANY*

*902 King Street, Wilmington 99, Delaware*

Reg. U. S. Pat. Off.

# Financial Record

| Preferred Stocks | Per Share Calendar Year 1947 | Earnings 12 Mos. to Approx. 9/30/48 | Indic. Annual Divid. Rate | Dec. 28 Approx. Market Price |
|---|---|---|---|---|
| Armstrong Cork Co. $3.75 Cum. | $38.64* | $43.53*i | $3.75 | 95¾ |
| Armstrong Cork Co. $4.00 Cum. Conv. | 38.64* | 43.53*i | 4.00 | |
| Celotex Corp. 5% Cum. | 24.25c | 26.25g | 1.00 | 17¾ |
| Champion Paper & Fibre $4.50 Cum. | 65.90f | 43.82j | 4.50 | 91½ |
| Container Corp. of Amer. 4% Cum. | 102.74 | 98.49 | 4.00 | 95 |
| Crown Zellerbach $4.20 Cum. | 56.40f | 59.10k | 4.20 | |
| Crown Zellerbach $4.00 Cum. Conv. 2nd | 211.39f | 178.01k | 4.00 | |
| Dixie Cup Co. $2.50 Cum. Conv. Cla | 9.16 | 9.61 | 2.50 | 50⅝ |
| Flintkote Co. $4 Cum. | 81.91 | 87.68 | 4.00 | |
| Robert Gair Co., Inc. 6% Cum. | 18.01 | 15.97 | 1.20 | 17⅛ |
| International Paper Co. $4 Cum. | 236.51 | 242.27 | 4.00 | |
| Johns-Manville $3.50 Cum. | 128.81 | 175.15 | 3.50 | 107⅜ |
| Kimberly Clark Corp. 4½% Cum. | 70.03 | 82.79 | 4.50 | |
| Kimberly Clark Corp. 4% Cum. Conv. 2nd | 95.88 | 114.55 | 4.00 | 94 |
| MacAndrews & Forbes 6% Cum. | 62.20 | 59.89 | 6.00 | |
| Mead Corp. 4¼% Cum. | 81.56 | 80.43 | 4.25 | 82⅞ |
| Mead Corp. 4% Cum. Conv. 2nd | 53.34 | 51.89 | 2.00 | 32¼ |
| Paraffine Cos. Inc. 4% Cum. Conv. | 152.76a | 158.96 | 4.00 | |
| Rayonier Inc. $2 Cum. | 13.58 | 16.09 | 2.00 | 31½ |
| St. Regis Paper Co. 4.40% 1st A | 76.93 | 85.00 | 4.40 | 80⅝ |
| Scott Paper Co. $3.40 Cum. | 43.95 | 54.31 | 3.40 | |
| U. S. Gypsum Co. 7% Cum. | 211.34 | 300.59 | 7.00 | |
| United Wallpaper Inc. 4% Cum. Conv. | (d)1.35a | (d)6.28 | 2.00 | |
| West Virginia Pulp & Paper 4½% Cum. | 75.75c | 78.49g | 4.50 | 106 |
| **Common Stocks** | | | | |
| APW Products Co. | $1.24 | $1.32 | $0.25 | 4⅜ |
| American Writing Paper Corp. | 1.61 | 0.02 | 0.25 | 5⅜ |
| Armstrong Cork Co. | 6.41 | 7.17i | 3.00 | 47½ |
| Celotex Corp. | 6.59c | 7.15g | 2.00 | 26 |
| Certain-Teed Prods. Corp. | 3.75 | 3.99 | 1.15 | 13⅛ |
| Champion Paper & Fibre | 5.57f | 3.81j | 2.00 | 22⅝ |
| Congoleum Nairn Co. | 4.55 | 5.12i | 2.25 | 28⅜ |
| Container Corp. of America | 10.09 | 9.54 | 4.50 | 33⅝ |
| Crown Zellerbach | 6.81f | 6.70k | 2.00 | 23⅝ |
| Dixie Cup Co. | 5.87 | 6.26 | 1.00 | 26⅝ |
| Eastern Corp. | 5.02 | 6.51 | 1.00 | 13½ |
| Flintkote Co. | 6.27 | 6.28 | 3.00 | 29⅞ |
| Robert Gair Co., Inc. | 2.83 | 2.49 | 0.70 | 6¾ |
| Great Northern Paper Co. | 4.56 | 4.55 | 2.80 | 36½ |
| International Paper Co. | 15.02 | 15.39 | 5.00 | 51½ |
| Johns-Manville Corp. | 3.17 | 4.28 | 2.00 | 38⅝ |
| Kimberly-Clark Corp. | 4.29 | 5.16 | 1.65 | 20¾ |
| MacAndrews & Forbes Co. | 3.68 | 3.53 | 2.50 | 36 |
| Marathon Corp. | 3.39c | 3.93g | 1.40 | 20¼ |
| Mead Corp. | 7.33 | 7.11 | 2.00 | 15¾ |
| National Container Corp. | 4.13 | 2.86 | 1.20 | 9⅜ |
| Paraffine Cos. Inc. | 2.40a | 2.50 | 1.20 | 18¾ |
| Rayonier, Inc. | 7.30 | 8.88 | 2.00 | 25⅞ |
| Ruberoid Co. | 10.88 | 12.90 | 3.25e | 54⅜ |
| St. Regis Paper Co. | 2.66 | 2.86 | 0.80 | 8½ |
| Scott Paper Co. | 3.02 | 3.79 | 2.50 | |
| Sutherland Paper Co. | 6.87 | 6.43 | 2.50 | 32½ |
| Taggart Corp. | 1.29 | | 0.60 | 10⅞ |
| Union Bag & Paper Corp. | 7.93 | 8.13 | 4.00 | 31⅛ |
| United Board & Carton | 4.95b | 3.39h | 1.25 | 7⅛ |
| U. S. Gypsum Co. | 10.00 | 14.36 | 6.00 | 99¾ |
| United Wallpaper | (d)0.11a | (d)0.27 | — | 3 |
| West Virginia Pulp & Paper | 11.40c | 11.56g | 4.00 | 39¾ |

(a) Year ended 6/30/48
(b) Year ended 5/30/48
(c) Year ended 10/31/47
(d) Deficit
(e) Plus stock
(f) Year ended 4/30/48
(g) 12 months to approximately 7/31/48
(h) 12 months to 8/21/48
(i) 12 months to approximately 6/30/48
(j) 5 months to 9/30/48
(k) 12 months to approximately 10/30/48
(*) Pro forma

## Dividends Declared

*Donnacona Paper Co., Ltd.,* has declared a dividend of $1.12½ per share on its preferred stock, payable February 14 to shareholders of record on January 14.

*Price Bros., Ltd.,* declaring a semi-annual dividend of $2 per share on its common stock payable February 1, discloses that some shareholders had brought up the question of paying dividends quarterly or half-yearly instead of annually. Following consideration, it was decided to pay half-yearly dividends for the time being. The company reports that 1948 earning will be higher than in 1947 ($10.80).

*Hinde & Dauch Paper Co.,* has declared an extra dividend of $1 and the usual quarterly of 50 cents on the common. The extra is payable December 24 and the regular January 3 both to stock of record December 6. This brings 1948 declarations to $3 against $3.50 in 1947 when an extra of $1.50 was paid on December 24.

*Chesapeake Corp. of Virginia* (paper products) declared a dividend of 75 cents on its common stock, payable January 3 to stock of record December 23. This brings 1948 declarations to $2.75 as four declarations of 50 cents previously were made, comparing with $2.50 voted last year.

*St. Lawrence Paper Mills, Ltd.,* has declared a dividend on its first preferred stock of $1.50 and 60 cents on its second preferred stock. Also 75 cents per share on its common stock, payable January 25 to shareholders of record January 3.

*St. Lawrence Corp., Ltd.,* has declared a dividend of 50 cents per share on its first preferred stock and another dividend of 18¾ cents per share on its second preferred stock, payable January 25 to shareholders of record on January 3.

*Bathurst Power & Paper Co., Ltd.,* has declared a dividend on its Class "A" stock of 37½ cents, plus 75 cents extra dividend, and on Class "B," 25 cents per share, payable March 1 to shareholders of record on February 1.

*Provincial Paper, Ltd.,* (Canada) has declared a regular quarterly dividend of one percent on its preferred stock, payable December 15, to shareholders of record on December 4.

*Adrian, Simplex Paper Corp.*—Quarterly of 20 cents, plus five percent stock dividend, payable December 22, record of December 15.

*Southern Advance Bag & Paper Co.* has voted a 100 percent common stock dividend to holders of record December 24.

## Commercial Failures

OTTAWA—There were two commercial failures in the pulp and paper manufacturing industry in Canada in the third quarter of 1948 compared with none in the same period of the preceding year, both occurring in the Province of Quebec, according to the Canadian Government. In the first three quarters of 1948 there were three such commercial failures, though in the previous year during the same time only one such bankruptcy was recorded.

# SWEET MUSIC

Although Orr chemically-treated felts, known as Orr-Chems, have been available only a little over a year, already a large percentage of the mills have tried them and practically 25% have adopted them. From the standpoint of both manufacturer and mill, it certainly is "Sweet Music."

For a "maiden year" effort the above showing adds up to a record hard to beat and points the way for mills not yet Orr-Chem conscious.

Analyzing that record, the mills report the following benefits, not a single one of which should be passed over lightly.

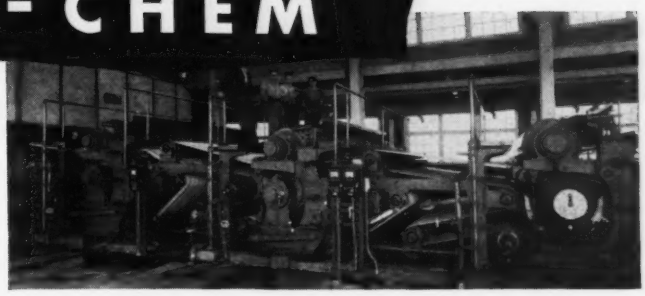
*Orr-Chems set to the machine more quickly*
*Orr-Chems stay on longer*
*Orr-Chems drain water faster*
*Orr-Chems require fewer wash-ups*
*Orr-Chems are less inclined to shrink, or stretch, or blow.*

These are not Orr claims. Rather, they are mill observations and they come from mills from coast to coast; from mills running practically every grade of paper and board made.

If you would cut the per-ton felt cost of your production and bring smiles to management, mill personnel, and stockholders, you should obtain some Orr-Chems for tryout.

**THE ORR FELT & BLANKET CO.**
PIQUA, OHIO

**ORR-CHEM**



# Obituary

*Walter D. McWaters,* manager of the Portland division of the Zellerbach Paper Co. from 1913 through 1945, died on December 8 at Palm Springs, Cal., where he had made his home since his retirement. McWaters in 1929 was elected president of the Pacific States Paper Trades Ass'n., and was for many years president of the Portland Paper Merchants Ass'n. Surviving are his widow, Mrs. Margaret McWaters, and a son, Walter R., who succeeded his father as manager of the Zellerbach firm here.

*John H. Schwarz,* 70, president of the Schwarz Paper Co., Lincoln, Neb., died on December 8, following a heart attack which he suffered several weeks previously. Surviving Mr. Schwarz are a brother, William of Casper, Wyo.; a sister, Mrs. H. C. Wilson of Denver; and a daughter-in-law, Mrs. Roscoe Alexander of Lincoln.

*James G. Pardee,* 66, head of the Pardee Co., Youngstown, Ohio, dealer in paper products and seasonal novelties, died of a heart ailment in St. Elizabeth Hospital on December 15. Mr. Pardee leaves his widow, the former Edna Coburn; a son, John, who was associated with him in business; a daughter, Mrs. John Pearce of Tulsa, Okla.; three brothers, Donald, Floyd and Rolla; and a sister, Mrs. Bertha Gardner.

*Frederick William Leadbetter,* 73, of Santa Barbara, Calif., philanthropist and a leader in the Pacific Northwest paper and lumber industries, died unexpectedly in Los Angeles on December 22. Besides his widow, Mr. Leadbetter leaves a son, Henry Lewis Pittock Leadbetter of Portland, and three daughters, Mrs. Frank G. Andreas of England, Mrs. Nil Teren and Mrs. Ambrose Cronin, Jr., both of Portland.

*Charles G. Thomas,* 73, retired two years ago after 35 years' service with the Paper Mill Products Co., Swarthmore, Pa., died at his home in Chester, Pa., on December 15, after a lengthy illness. He is survived by his widow, Mrs. Irene Simpson Thomas; a son, and five daughters.

*Frank Hale Meek,* 81, an operator of the Frank Meek Paper Co., Knoxville, Tenn., for 16 years before his retirement in 1942, died at his home on Lowe's Ferry Pike on December 12. He leaves the widow, Mrs. Almena Smith Meek; and a son, B. L. Meek.

*Michael T. Lynch,* foreman at the Whiting Paper Co., Holyoke, Mass., died at Holyoke Hospital on December 21 from injuries sustained in an automobile accident on December 18.


**Now Available**

**SAP BROWN**

from

**American Lignite**

**Unlimited Quantities**
**Lowest Prices**

Try American Sap Brown for low cost brown paper with or without toning colors. Ask for samples and information.

**American Lignite Products Co.**
**Ione, Calif.**

Eastern Agent, B. M. Snyder III
621 Cherry St.
Phila. 6, Pa.


## Patra Laboratories

*(Continued from page 10)*

library—the key to which is a card index of over 100,000 items covering books, periodicals, pamphlets, patents, catalogs and other matter of interest to the printing and packaging industries.

Paper manufacturers who contributed to the PATRA building and equipment fund include: Bowater Paper Corp., Ltd.; British Cellophane, Ltd.; John Dickinson & Co., Ltd.; Samuel Jones & Co., Ltd.; and Albert E. Reed & Co., Ltd. The firm of Wiggins, Teape & Alex Pirie (Sales) Ltd., also contributed.

## Given Forestry Award

BOSTON—Herman Haupt Chapman of New Haven, Conn., professor emeritus of forest management at Yale University and past president of the Society of American Foresters, was awarded the Sir William Schlich memorial medal at the annual meeting of the Society here on December 17. Presentation of the medal to Dr. Chapman was made by Clyde S. Martin, president of the Society of American Foresters and manager of forestry relations for the Weyerhaeuser Timber Co., Tacoma, Wash.

## Huber Office Expands

NEW YORK—The local offices of the J. M. Huber Corp., 342 Madison avenue, producer of carbon black, oil and gas, kaolin clay, and printing inks, have been expanded to include the office of the director of purchases and the finance and accounting departments of the corporation, formerly located at the Brooklyn plant. Moving to New York are Treasurer R. J. Cashion and his assistants, and E. M. Krech, director of purchases. Purchasing office of the ink division will remain in Brooklyn under the direction of Charles Cubbison.

## New Color Guide

NEW YORK—A new Letterpress Color Guide—in both file and pocket size—has been announced to the trade by IPI. It shows 108 colors for general work plus new process colors and an improved line of halftone blacks. Each color specimen carries the monochromatic specification and Munsell designation as well as the IPI formula number. There is also a comparison of conventional process inks with the new IPI Gemtone Process Inks.

## Brake Shoe Ups Clapp

ROCHESTER, N. Y.—Philip H. Clapp, Jr., has been appointed sales manager of the engineered castings division of the American Brake Shoe Co. Mr. Clapp has been with Brake Shoe as a sales representative since 1946. He will continue to be located at the Division's headquarters here.

## Moving to Irvington, N. Y.

IRVINGTON, N. Y. — Central States Paper & Bag Co., which has leased the ground floor of the Bert Mfg. Co., has started to move machinery into the new quarters. The floor space is 30,000 square feet. Operations will start in January.

## Wheelco Houston Office

HOUSTON—Wheelco Instruments Co., Chicago, has opened a district office at 2204 Fannin street under the direction of George Hatfield, formerly of the Chicago office. The new office will serve Texas, Louisiana and New Mexico.

## New Huyck Directors

RENSSELAER, N. Y.—At a meeting of directors of F. C. Huyck & Sons, December 10, William Greeley and Roderick T. Clarke, treasurer and secretary of the company respectively, were elected to the directorate.

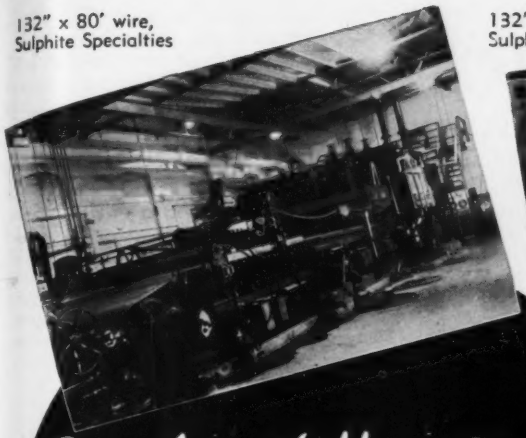
## Diamond Advances Hancock

CLEVELAND—C. S. Hancock has been named manager of calcium carbonate sales, of the Pure Calcium Products Division of the Diamond Alkali Co., Painesville, Ohio. He joined the firm as a salesman in 1936.

## Early to Detroit

CHICAGO — The Askania Regulator Co. has named Frank E. Early as its representative in the Detroit area, effective January 1.

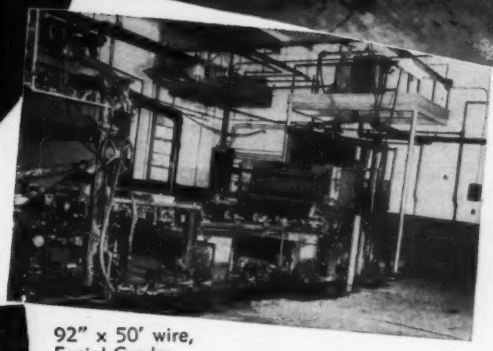
132" x 80' wire,
Sulphite Specialties



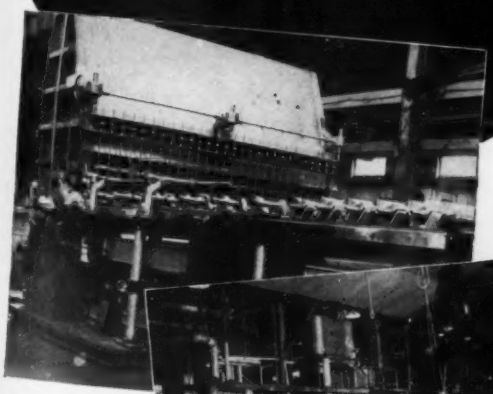
132" x 80' wire,
Sulphite Specialties

92" x 35' wire,
Toilet Tissue

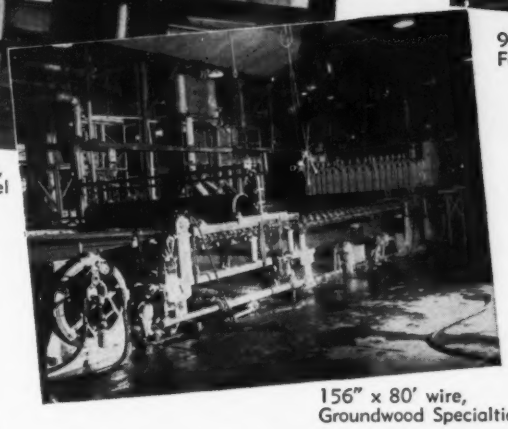
Sandy Hill
Fourdriniers
Some New
Installations



92" x 50' wire,
Facial Grades



156" x 65' wire,
Tissue and Towel



156" x 80' wire,
Groundwood Specialties

Sandy Hill is prepared to build any type of paper machine fourdrinier, either for improvement of formation and production, or in combination with a complete machine.

**Sandy Hill Iron & Brass Works**

**Hudson Falls, N. Y.**

*Machinists and Founders Specializing in Paper and Pulp Mill Machinery*

**Manufacturers of**
- Adjustable Cylinder Vats
- Cylinder Paper Machines
- Pulp Grinders
- Dandy Roll Drives

- Pulpers or Kneaders, Voith
- Thickeners
- Quick Opening Gate Valves
- Bertrams Flow Distributors
- Bertrams Shakes

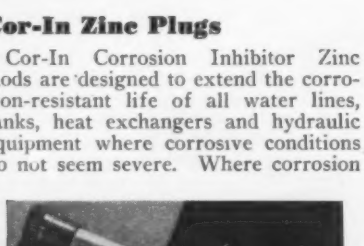
- Nelson Slice
- Feltless Wet Machines
- "Selective" and Corner Drives
- Fourdrinier Paper Machines
- "Packer" Screens

- Castings
- Bleaching Equipment
- Scofield Felt Conditioners
- Cleveland Type Bearings
- Shaker Screens

# Equipment & Supplies

### Cor-In Zinc Plugs

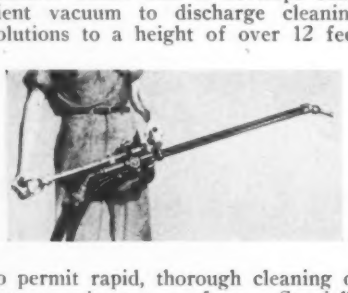
Cor-In Corrosion Inhibitor Zinc Rods are designed to extend the corrosion-resistant life of all water lines, tanks, heat exchangers and hydraulic equipment where corrosive conditions do not seem severe. Where corrosion



may be aggravated by hot or salt water or other corrosive agents and catalysts, or by the electrolytic action of dissimilar metals or stray currents, Cor-Ins are said to have basic application. The maker states that the zinc rod used in Cor-Ins is tested for its ideal reactivity ratio in water to insure that it will become more active when corrosive influences are severe, while remaining more passive when corrosive conditions are mild. Used as both new and replacement equipment for most makes of diesel engines, for refrigeration equipment, industrial radiators, water and oil coolers, heaters and other heat exchangers, as well as for all hydraulic units subject to corrosion. Come in ⅜, ½, ⅝, ¾ and 1 inch diameters with lengths to 12 inches. For details and prices write to Rotometals, Inc., 980 Harrison street, San Francisco 7, Calif.

### Solution-Lifting Steam Gun

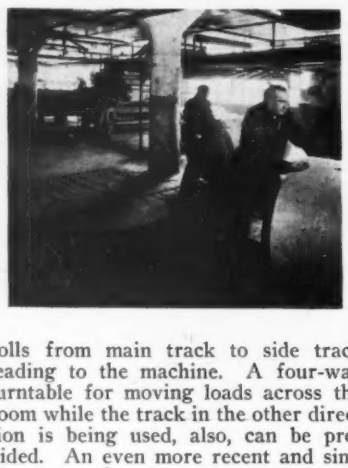
The Solution-Lifting Steam Gun is designed to facilitate volume cleaning operations in industrial plants. Manufacturer states that it develops sufficient vacuum to discharge cleaning solutions to a height of over 12 feet



to permit rapid, thorough cleaning of large-equipment surfaces. Specially constructed and balanced so that it may be used over extended periods without tiring the operator. Two-spade-type insulated handles are provided on the gun and so situated that each of the operator's hands supports the same weight during a high pressure steam-cleaning operation. Forward handle remains stationary in operator's grasp as gun is rotated, while rear handle is turned to rotate the gun when cleaning underneath and hard-to-reach surfaces. Steam and solution hoses are connected to the gun by swivel joints and remain stationary when gun is rotated, thus eliminating twisting of hose lines. Nozzle, tubes, valves and hose designed to turn freely as a unit as back handle is moved. Reinforced rubber apron backing up the steam valve and other hot fittings is provided as protection to the operator against burning. For details and prices about this Model 481 gun, write to Oakite Products, Inc., 148A Thames street, New York 6, N.Y.

### Epco Turntable

Epco Turntable and Floor Trackage Conveyors are designed to facilitate the handling of paper rolls or other heavy merchandise. Trackage crosses the entire room and has a turntable for three directional operations to turn the



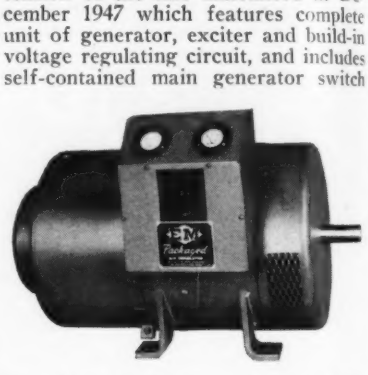
rolls from main track to side track leading to the machine. A four-way turntable for moving loads across the room while the track in the other direction is being used, also, can be provided. An even more recent and simpler development is called the Angular Fan-tail. The unit itself is described as stationary, and the load is turned on the movable balls rather than on rollers. Thus the load can be turned in any direction; and where it is finally conveyed depends on the number of tracks which lead to and from the Fan-Tail. Track, turntables and fan-tails require a maximum depth of 4 inches. For details and prices write to Engineering Products Co., 122 South Michigan avenue, Chicago 3, Ill.

### Emergency Fireman

The Emergency Fireman is described as a handy, dry-chemical fire extinguisher containing two pounds of Ansul Plus-Fifty Dry Chemical, designed for effective use by inexperienced operators. In the small extinguisher field, it is said to provide maximum protection for flammable liquid and electrical fires. Rechargeable on the spot after use. Maker states that the dry chemical is non-toxic, a non-conductor of electricity, non-corrosive and non-abrasive; that it will not deteriorate, solidify or evaporate, therefore does not require periodic recharging. Fill cap is built into the mounting bracket to make the extinguisher ready for instant use when removed from mounting bracket. For details and prices write to Ansul Chemical Co., Fire Extinguisher Div., Marinette, Wis.

### Packaged Generator

This Packaged Generator is an extension of the line announced in December 1947 which features complete unit of generator, exciter and build-in voltage regulating circuit, and includes self-contained main generator switch



on ratings to 15 kw. It is stated that no additional switches or controls are necessary; unit is connected direct to load. Complete line now features units in single and three phase ratings to 150 kw. at speeds 900 r.p.m. to 1800 r.p.m. For details and prices write to Electric Machinery Mfg. Co., Minneapolis 13, Minn.

# Literature

*Dings Magnetic Separator Co.*, 4740 W. McGeogh avenue, Milwaukee, 14, Wis. Catalog, "Dings Magnetic Pullevs and Pulley Type Separators", C-1001A; also "Non-Electric Alnico Magnetic Perma-Pulleys" C-1007A. Provide a complete description of features and applications of Electrogamnetic Pulleys and Alnico Magnetic Perma-Pulleys for automatic separation of ferrous and non-ferrous materials.

*G. D. Jenssen Co.*, Electric Bldg., Watertown, N. Y. Bok, "Acid Making in the Sulphite Pulp Industry". Describes the prepaartion of raw acid and cooking acid for sulphite pulp cooking. Provides a comprehensive review of various process arrangements for acid preparation in the sulphite pulp industry. The book will be published in Canada, and one complimentary

copy will be distributed to each of the sulphite pulp mills for the mill library. Additional copies $6.00 each.

*Liquid Conditioning Corp.*, 114 East Price street, Linden, N. J. Brochure, "Why Liquon Is Outstanding In Water Conditioning". Outlines the background, facilities, processes and equipment offered by Liquon in fields of water treatment and conditioning of other liquids. Contains illustrations of plant facilities and installations of equipment. Of interest to executives and engineers concerned with the treatment of water for steam generation, process work or general plant services.

*Economic Accounting, Inc.*, 308 Citizens Building, Decatur, Ill. Booklet, "Price Problems, An Accounting Report" by Franzy Eakin, price $1.00. Accounting techniques and principles are used to assemble and examine the nation's economic accounts to determine the nature of price problems and as a basis for recommendations to establish a dynamic and balanced economy. The report makes seven recommendations for immediate action to ease the present price situation and nine to prevent recurrence. Published by a not-for-profit research and educational institute, privately financed.

*American Cyanamid Co., Paper Chemicals Dept.*, 30 Rockefeller Plaza, New York 20, N. Y. Technical Bulletin, "Azite Liquefier 900", Cyanamid's trade name for Dicyandiamide. Booklet includes chemical and physical properties of the product, also test data on its use in starch solutions, in protein adhesives and sizes, for paper coatings, and for improving the permanence and heat stability of papers containing acidic constituents.

*Farris Engineering Corp.*, 634 Commercial avenue, Palisades Park, N. J. Booklet, "Catalog and Data on Safety and Relief Valves". Covering complete information needed in connection with installation and use of safety and relief valves. Provides comparison and selection charts, also triple capacity tables for water, air and steam and tight vapor sizing chart.

*Armstrong Machine Works*, Three Rivers, Mich. Bulletin, No. 187, "Individual Dryer Temperature Control for Paper Machines." Describes how steam and air ratio is controlled to produce desired dryer temperature. Provides diagrammatic principle of operation, and schematic drawing of heart of the control.

*Link-Belt Co.*, 307 N. Michigan avenue, Chicago 1, Ill. Catalog, "Make Ceilings Pay Dividends", illustrated book, No. 2330, on Link-Belt Overhead Trolley Conveyors. Depicts a variety of actual installations and shows flexible adaptabiilty of this type of conveyor.

*Ford, Bacon & Davis, Inc.*, 39 Broadway, New York. Brochure, "Sound Organization—A Requisite for Good Management". Discusses responsibilities and functions essential for good management, why relationships when not defined get out of hand, job description, etc., and provides charts as outline for organization.

*The Brookings Institution*, Washington, D.C. Booklet, "Economic Systems" by Harold G. Moulton, president of Brookings Institution, price $.50. The study, conducted under grant from Falk Foundation of Pittsburgh, appraised developments and trends in government regulation and control of business in recent years, covering the fields of finance, industry and transportation. Argues that "the nation must draw a clear line of necessary regulation and control which involves the assumption of managerial functions, if the private enterprise system is to continue as the type of economic organization in the U.S. While prevention of monopoly and regulation of the plane of competition is indispensable, substitution of government control for the decisions of business management will make the successful operation of private enterprise progressively more difficult and eventually impossible. Certain naturally monopolistic industries, such as public utilities, where competition is impracticable and undesirable, obviously require regulation. In other areas, regulation must be designed to preserve and strengthen the competitive system. It is readily possible to draw the line between regulations which establish rules of the game and set standards of performance, and controls which usurp managerial functions and substitute overhead government policies and directives for market mechanisms as guides to economic development. Only with such a line drawn can the creative power of private enterprise . . . be preserved. Such a method of regulation, in contrast to communism, socialism, and hybrid systems of control, would ensure the preservation of individual liberties."

*Connecticut Agricultural Experiment Station*, New Haven, Conn. Booklet, "The Forest Soils of Connecticut", Bulletin 523. Supersedes Bulletin 342, "Profile Characteristics of New England Forest Soils", long out of print. Makes available to those interested in forest soils the material gained in field and laboratory studies since 1932.

*Gotham Ink & Color Co.*, 5-19 47th avenue, Long Island City 1, N. Y. Pamphlet, "Rotogravure Printing". Briefly compares gravure with other conventional printing processes, and in some detail discusses cylinders, pressure rolls, doctor blades and ink. Revised edition of 1945 publication.

*Mead Corp.*, Chillicothe, Ohio. House Organ, "The Reporter", Vol. 1, No. 13, July 24, 1948. Discusses Mead's "How To Give Away A Tree" program.

## New Sales-Engr. Service

PITTSBURGH—Process Industries Engineers, Inc., has opened offices here to integrate two complementary services (1), the sale of equipment of nationally known manufacturers where engineered applications are satisfactory, and (2), the design and fabrication of equipment where special designs are necessary. The company's specialization is in the field of interrelated unit process operations, which include material storage, handling, fluid movement, mixing and agitation, reduction and separation.

The company will also specialize in the fields of impregnation, drying, vulcanization, fumigation, etc., and will design, contract for fabrication, inspect during manufacture, and render technical assistance during plant installation and initial stages of operation, William W. Calihan, vice-president, reports.

Mr. Calihan, who recently resigned as director of sales and advertising of the H. K. Porter Co., Inc., has been affiliated with the processing industries for approximately 20 years. R. R. Maccary, R. E. Nelson, and R. F. Fey, the company's other officials, have served the processing industries through long standing associations with prominent manufacturers of process equipment and chemical plant designers, in executive, engineering, and sales capacities.

## Two Firms Merge

NEW YORK—Merger of the Combustion Engineering Co., Inc., and the Superheater Co., was consummated on December 22 by approval of the stockholders of both companies. It becomes effective on December 31, under the new name of Combustion Engineering-Superheater, Inc.

Officers of the new company are: Frederic A. Schaff, chairman of the board; Samuel G. Allen, executive committee chairman; Joseph V. Santry, president; Martens H. Isenberg, executive vice-president; Harold H. Berry, vice-president in charge of finance; George D. Ellis, vice-president and controller; Otto W. Strauss, vice-president and treasurer; Wilbur H. Armacost, vice-president in charge of engineering; Donald S. Walker, vice-president in charge of sales; Albert C. Weigel, vice-president; Amaziah J. Moses, vice-president, Chattanooga Division; John S. Skelly, vice-president, Monongahela division; Arthur Williams, vice-president; Irving B. Swigart, secretary and assistant treasurer; Thomas F. Morris, assistant to the chairman and assistant secretary.

## Spencer Rotary Speaker

WATERTOWN, N. Y.—The proposed program in the state to stop the pollution of streams, rivers and ponds was outlined to members of the Rotary club December 15, by Horace A. Spencer, technical director of Knowlton Brothers, Inc., local paper manufacturing concern.

## Revising Schedule B

WASHINGTON—The Schedule B commodity classification code number required on Shipper's Export Declarations effective January 1949 will be shown in the new 1949 edition of Schedule B just released, the U. S. Department of Commerce reports. The new commodity classifications can be obtained only from this new 1949 Schedule B. The current Schedule B, even with amendments, will be obsolete after December 31.

Part I, the Alphabetic Index of Schedule B, is in the form of an alphabetic listing of commodities to be used to locate the correct Schedule B commodity numbers to be shown on Shipper's Export Declarations, Part II is arranged in numerical sequence of Schedule B commodity numbers, showing a list of individual commodity items included in each numbered classification.

The 1949 edition of Schedule B may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., local Collectors of Customs, and Department of Commerce Field Offices located in principal cities at $2.50 for Part I and $1.50 for Part II. A limited number of copies of Schedule B will be available for reference purposes in the Department of Commerce Field Offices and in offices of Collectors of Customs.

Exporters must use the new 1949 Schedule B starting January 1949. All previous editions of Schedule B are obsolete after December 31, 1948.

## Materials Handling Expo.

PHILADELPHIA — Manufacturers and suppliers of equipment, material and service for the paper industry who will be among the several hundred exhibitors at the Materials Hhandling Exposition at Convention Hall, January 10-14, include:

Automatic Transportation Co.; Baker Industrial Truck Division, Baker-Raulang Co.; Barrett-Cravens Co.; Chisholm-Moore Hoist Corp.; Clark Equipment Co., Clark Tructractor Division; Darnell Corp.; Dempster Brothers, Inc.; Electric Storage Battery Co.; The Elwell-Parker Electric Co.; Fairbanks Co.; Garlock Packing Co.; General Electric Co.; Gould Storage Battery Corp., and Hyster Co.

Lewis-Shepard Products, Inc.; Revolvator Co.; Toledo Scale Co.; Towmotor Corp.; U. S. Steel Corp.; Westinghouse Electric Corp.; Whiting Corp.; Wright Hoist Division, American Chain & Cable Co.; Yale & Towne Mfg. Co., and Gummed Industries Assn.

## Forest Management License

VANCOUVER, B.C. — To December 3 the British Columbia government had granted only one forest management license under the system established 18 months ago, although about 115 inquiries have been received by the B.C. Forest Service from timber and pulp mill companies seeking forest management licenses. Officials of the service feel that about 50 percent of these may eventually result in the granting of management licenses. The license issued is that to the Columbia Cellulose Co., Ltd., a subsidiary of the Celanese Corp. of America, for a big tract of timber to supply the company's proposed plant on Watson Island, near Prince Rupert. Construction of the plant, which will supply high grade pulp for synthetic yarns, is under way.

The cabinet has also given approval in principle for two other forest management licenses. They are for pulp mills which the Canadian Western Timber Co., Ltd., proposes to erect at Duncan Bay, near Campbell River, and which Western Plywoods, Ltd., is projecting near Quesnel.

## Pine Planting Film

ATLANTA—An informational film on the subject of tree planting in the South "Lonnie's New Crop" has been completed under the sponsorship of the Southern Pulpwood Conservation Ass'n., 1516 First National Bank building and the Georgia Forestry Department, H. J. Malsberger, association forester reports. It shows how a young farmer makes unproductive land work at a profit growing trees. Running time of the sound-color film is about ten minutes. Mr. Malsberger says that the Association will sell the film for the cost of printing and that a limited supply will also be available for loan.

## UK Newsprint Hopes

LONDON—The Newsprint Supply Co. is reported to have been notified by the Board of Trade that the permitted total of imports of newsprint from Canada and Newfoundland in 1949 will be a minimum of 80,000 long tons, of which total the company may import up to 60,000 tons in the first half of the year. leaving a minimum of 20,000 tons to be imported during the second half. It is added that Canadian and Newfoundland mills have been asked by Newsprint Supply Co. to reserve an additional 20,000 tons which they hope to have authority to import if the dollar situation permits.

## Export Firm Formed

MONTREAL—Canadian Overseas Paper Co., is reported as having been formed by six "principal Canadian mills" to deal directly with major publishers in Australia. It is further reported that Overseas Newsprint, Pty., Ltd., has been formed in Melbourne, Australia, to handle sales to minor Australian publishers and paper merchants, presumably as a part of the Canadian Overseas Paper Co., operation.

## R. C. Von Maur Named

DETROIT—Robert C. Von Maur has been named manager of central sales with headquarters here for the Champion Paper and Fibre Co., of Hamilton, Ohio.

## Coast Cuts Accidents

LOS ANGELES — Industrial accidents in the pulp and paper industry on the Pacific Coast have been reduced 45 percent in the las three years, it was revealed at the third annual Labor-Management Safety Conference of the California pulp and paper industry at the Mayfair on December 3.

"The combined efforts of 33 mills and 15,000 workers have reduced accidents from 27 to 15 injuries per 1,000,000 man-hours since we started these safety meetings," R. S. Wirthheimer, secretary-treasurer of the Pacific Coast Ass'n. of Pulp & Paper Manufacturers, told 200 delegates. California, which already had a good record, dropped 23 percent, from 17 to 13.

Other speakers included John Sherman, vicepresident of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers; Otto Hartwig, general safety supervisor, Crown Zellerbach Corp., and Al Brown, vice-president of the International Brotherhood of Paper Makers.

## Soda Ash for Brazil

WASHINGTON — First quarter, 1948, Brazilian imports of soda ash, largely from the United States, amounted to 7,890 metric tons, official figures just received here indicate. Imports in the comparable 1947 quarter were 7,140 tons. The United States furnished 3,699 tons out of the 1948 imports reported.

In the same quarter, figures showed caustic soda as among Brazil's 10 principal imports by value from the United States for those months. Compared with only 485 tons, valued at $109,000 in the same quarter of 1947, those for first quarter, 1948, totaled 10,290 metric tons, worth $3,376,000.

Total caustic soda imports by Brazil, from all sources, were 17,290 tons, of $4,505,000 value.

## Barbour Fraser Director

EDMUNDSTON, N.B.—G. E. Barbour has been elected a director of the Fraser Companies, Ltd., filling a vacancy left by the death of Hon. R. B. Hanson, P.C. Mr. Barbour is president and general manager of the G. E. Barbour Co., Ltd., Saint John; president of the Reed Co., Ltd., Moncton, and a director of the Bank of Montreal. He is a past president of the Saint John Board of Trade.

## Radke, Dayo, Casey Upped

PORT EDWARDS, WIS.—Nekoosa-Edwards Paper Co. on December 10 appointed Walter A. Radke, Nekoosa, as treasurer; Harry Deyo assistant-treasurer and controller and Sam A. Casey, secretary. The new appointments were made to fill the offices vacated by the resignation of C. A. Jasperson, who is retiring on January 1 after 50 years of continuous service. They take effect on that date.

# Forest Products Research Society Enjoys Rapid Growth

**By CHARLES E. VAN HAGAN**
Secretary-Treasurer—Forest Products Research Society, Madison, Wis.

Organized in January 1947 for the purpose of facilitating interchange of information throughout the forest products industry and promoting more efficient utilization of wood and other forest products, the Forest Products Research Society has rapidly achieved prominence as an influential factor in the industry. It is unique in that it is the only society that embraces the entire forest products industry. In addition its membership is open to men in all classifications of work.

It is common to find representatives of such branches as pulp and paper, furniture, lumber manufacturing, and wood preservation gathered at the same FPRS meeting to discuss problems of interest to all. Similarly, the same meetings are attended, for example, by chemists, engineers, mill superintendents, foresters, administrative officers, editors, and economists. This "horizontal" make-up of the FPRS, as opposed to the "vertical" character of the usual professional or trade association, offers a practical means of achieving true interchange of information with resulting benefit to the entire industry

The need for an organization of this type became evident during World War II when research programs were stepped up and men on the production line were reaching for news of the latest technical developments. As soon after the end of the war as possible, therefore, a nation-wide conference on state and federal research in forest products was held in Madison, Wis. Leaders in the various fields gathered in March, 1946, to discuss the problem of organizing a society through which they could unify their efforts. Among those who attended this meetnig were such men as Fred W. Gottschalk, technical director of the American Lumber & Treating Co.; George A. Garratt, dean of the School of Forestry, Yale University; George M. Hunt, director of the U. S. Forest Products Laboratory; and Bror L. Grondal, professor of forestry at the University of Washington.

From the groundwork of this meeting grew the Forest Products Research Society, which came into existence in its present form at a meeting held on January 3, 1947, in Madison. The first officers of this non-profit society included Mr. Gottschalk as president, Mr. Garratt as vice-president, and William J. Baker of the Forest Products Laboratory as secretary-treasurer. In less than two years from the time of its organization more than 1,800 memberships have been accepted.

GEORGE A. GARRATT
President
Forest Products Research Society.

Although membership was originally limited to the United States and Canada, it was soon opened to residents of other countries and the Society now has members in 22 foreign nations.

Before the first year ended, the executive board, in response to many requests, established a student membership grade. Students from forestry schools have taken advantage of this class of membership and are now requesting permission to inaugurate student sections. Thus, the influence of the Society is rapidly spreading throughout the entire field of forest products.

Four classifications of memberships have been estabilshed to accommodate the variety of persons who wish to join the Society. The majority, of course, are voting members; individuals actively engaged in planning, supervising, or working in forest products research, development, production, or utilization. Persons who are interested in, although not actively engaged in these activities, may join as associate members. A substantial number of organizations and individuals who wish to give additional financial support to the Society have become supporting members. This group includes organizations engaged in a wide variety of businesses; for example, pulp and paper, adhesives, furniture, logging and lumber manufacture, machinery, and others. The fourth class of members is the student grade; individuals enrolled in universities or colleges preparing for a career in the field of forest products.

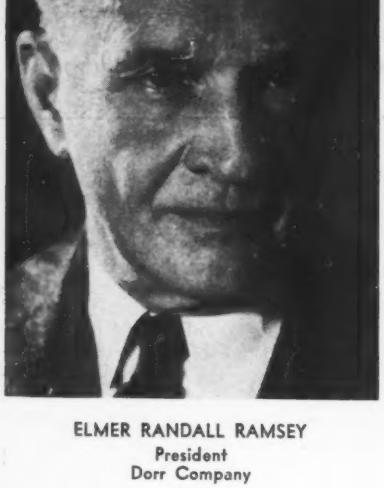
The Society has established a program that includes sponsorship of national and sectional meetings, publication and distribution of information on all phases of the industry, encouragement of cooperation between industry, educational institutions and state and federal laboratories, promotion of standard test methods and procedures, and the abstracting of papers, reports, and other publications of interest to its members.

As the principal event of the year's activities, the entire Society gathers in a national meeting held in the spring of each year. The attendance at the two meetings held to date is evidence of their success. The first, in Chicago in October, 1947, was attended by 478 persons, while 550 were at the Second National Meeting in March, 1948.

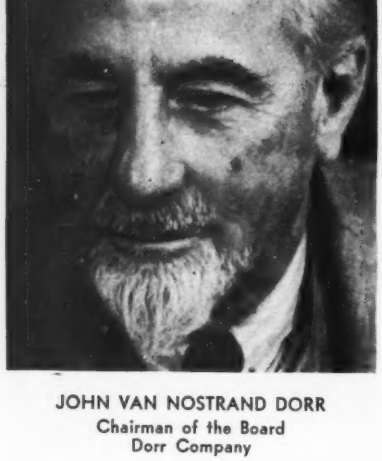
Among the 63 papers presented at those two meetings were discussions of such varied subjects as the chemical utilization of wood, integrated logging, engineering aspects of wood use, preservation and seasoning, bark removal and utilization, and the mechanical conversion of wood waste and manufacture of fiber products.

In addition to the national activities, the Society operates on a regional and sectional basis, with the United States divided into six regions, of which the northern three extend into adjacent sections of Canada. Each region is represented on the executive board by a director, who also sponsors the activities of the local sections within his region. At the present time there are six active local sections including the Northeast, Midwest, Pacific Northwest, Virginia - Carolinas, Florida - Georgia - Alabama, and Northern California sections. Movements are in progress to start additional sections in other parts of the country. Local sections hold meetings at least once a year, at which problems of special interest to the men in each particular section are discussed. Papers presented at these meetings are of the quality of those at the

*(Continued on page 42)*



ELMER RANDALL RAMSEY
President
Dorr Company



JOHN VAN NOSTRAND DORR
Chairman of the Board
Dorr Company

# Dorr Co. Executive Advances

NEW YORK—Dr. John Van Nostrand Dorr, chemical, metallurgical and industrial engineer, and inventor who founded the Dorr Co., engineers, and its associated companies in Europe, has become chairman of its board of directors and continues as chairman of the board of Dorr-Oliver, Ltd., London. Elmer R. Ramsey, who has been connected with the company for 34 years, for several years operating vice-president, succeeds Mr. Dorr as president of the Dorr Co.

Mr. Dorr's inventions, notably the Dorr Classifier, Dorr Thickener and Dorr Agitator and modifications thereof, plus those of his staff, have been applied successfully in over 100 processing industries.

The Dorr Co., organized in 1916, is the successor of the Dorr Cyanide Machinery Co. of Denver, formed in 1910 to market the Dorr Classifier, Thickener and Agitator, plus engineering services, which up to that time Dr. Dorr had handled under his own name. Dr. Dorr's urge to invent, he discloses, stemmed from some 30 months of association, while a youth, with Thomas A. Edison in his Orange, N. J., laboratories. This assrociation also ed to Dr. Dorr's majoring in chemistry at Rutgers University and adopting, as his own motto, Mr. Edison's "Try anything once."

Mr. Ramsey after graduation from Colorado School of Mines in 1912, went to work for Dr. Dorr in 1913, spending the next year on test work, design, construction and initial operation at various gold cyanide mills. In the spring of 1914, Mr. Ramsey became a junior engineer with the Dorr Cyanide Machinery Co., and in 1920 became western manager of the equipment sales department. In 1927 he moved to New York, when he was successively assistant general sales manager; executive assistant to the president; vice-president in charge of engineering department, and operating vice-president. He as been a director of the company and a member of its Executive Committee since 1933.

## Forest Products Research

*(Continued from page 41)*

national meetings, and the attendance, consequently, is high.

The papers presented at the National Meetings are published in the *Proceedings of the Society,* sent to all members as part of their membership privileges. The two volumes of proceedings that have been released have also been made available for purchase by non-members of the Society and have been in constant demand. The papers contained in the proceedings were also given wide distribution in the form of preprints prepared before each meeting. The demand for these has come not only from North America but also from many foreign countries.

The membership of the Society is kept abreast of current activities by a *Monthly Bulletin,* printed in a national trade journal and distributed to all members. The bulletin also contains late information from the field of forest products research and abstracts of technical papers. The abstracting work is presently concentrated upon foreign articles and publications not readily available to members.

Leadership of the FPRS has been in the hands of men recognized as key men in the field of forest products. Dean Garratt of Yale University is now president and will head the Society until the next National Meeting, at Grand Rapids, Mich., May 2-4. The first vice-president is Edward G. Locke, a chemical engineer with the U.S. Forest Service at Portland, Ore.; second vice-president is James F. Hamilton, technical service director of the Perkins Glue Co. Regional board members include: C. F. Van Epps of the Stromberg-Carlson Co.; Jac. H. Tigelaar of the Haskelite Mfg. Corp.; Robert D. Pauley of the Weyerhaeuser Timber Co.; Carl A. Rishell of the National Lumber Mfr's. Ass'n.; Kenneth G. Chesley of the Crossett Lumber Co.; and Robert A. Cockrell of the University of California.

Among numerous activities of the Society, one of the most promising is the work of the Committee on the Coordination of Forest Products Research. This committee, which is under the chairmanship of G. M. Hunt, director of the U. S. Forest Products Laboratory, and which is composed of representatives of industry, state and federal laboratories, and educational institutions, is charged with the task of searching for ways and means to encourage coordination by voluntary means in order to avoid unnecessary duplication of effort and the resultant waste of time and funds. The many federal, state, and private organizations now doing research in forest products are all more or less free agencies and as such are subject to the policies of their respective financial sponsors but are not guided by any outside agency. This condition results in appreciable duplication of effort. Reduction of this duplication to a minimum will benefit the entire industry. The Forest Products Research Society is the most promising medium through which voluntary coordination can be stimulated.

Additional information about the Society's requirements for membership may be had by writing to Charles E. Van Hagan, secretary-treasurer, Box 2010 University Station, Madison 5, Wis.

## Aussy Rationing Out

CANBERRA, Australia (delayed in transmission) — Newsprint rationing will end on December 31, Prime Minister Chiefley disclosed on November 19. Imports will continue subject to licensing restrictions because of the continuing dollar shortage.

## Labor-Management Comm.

OTTAWA—With 38 labor-management production committees in the pulp and paper industry of Canada, Labor Minister Humphrey Mitchell reports that there is a steadily increasing number of such committees throughout Canadian industries.

## November Shipments Up

MONTREAL, Que. — The Newsprint Ass'n. of Canada reported that Canadian newsprint shipments in November totalled 405,923 tons, 12,754 tons or 3.2 percent higher than in November, 1947. Shipments represented 107.7 percent of rated capacity compared with 104.2 percent in October and 111.7 in November, 1947.

Canadian production for November was 397,330 tons, an increase of 32,847 tons or nine percent over November, 1947. Production in November represented 105.5 percent of rated capacity, compared with 106.1 in October and 103.6 in November, 1947.

Shipments from United States mills increased by 8.9 percent and production by 8.8 percent over November, 1947, levels. Newfoundland shipments increased by 22.8 percent and production by 14 percent.

Stocks of all North American manufacturers decreased by 9,381 tons in November, amounting to 138,599 tons at the end of the month. Corresponding stocks for November, 1947, were 119,494 tons.

## Dard Hunter to Speak

PHILADELPHIA — Dard Hunter has been appointed the Rosenbach Fellow in Bibliography at the University of Pennsylvania for the year 1948-1949, President Harold E. Stassen disclosed on December 18.

Dr. Hunter, director of the Paper Museum at Massachusetts Institute of Technology, will deliver two illustrated lectures in Houston Hall at the University. The first, April 26, will treat of the Far East method of making paper by hand from its beginning 2,000 years ago. The second, April 28, will be based on early American papermaking.

Dr. Hunter is the author of many books on papermaking, including his recent "Papermaking, the History and Technique of an Ancient Craft." In 1937 he established the School of Papermaking in Madras, India. In this country, at Lime Rock, Conn., he has founded a mill for the manufacture of paper by hand.

## St. Helens Modernization

ST. HELENS, Ore.—The St. Helens Pulp & Paper Co., reports that $1,500,000 has been spent in modernization and replacement of machinery throughout the mill. As an example, it is revealed that seven new machines have been purchased for the bag factory, three of which have already been installed and four on delivery. To keep pace with the expansion of the mill capacity another boiler has been installed which will develop 50,000 pounds of steam every hour.

A new digester will add to the productive capacity of the mill, and a 500-foot railroad spur, together with a rolling crane, will facilitate the loading and unloading of freight and log cars and for loading tugboats. This installation alone cost the company over $100,000, and is completed.

The mill, which started on Jan. 4, 1926, has had a remarkable record of continuous production. During the almost 23 years of its existence only 11 days have been lost, and these days were during the height of the depression in the early 1930s.

## Crown Zellerbach Sales

SAN FRANCISCO — Net profits of the Crown Zellerbach Corp., including Canadian subsidiaries (Pacific Mills, Ltd.) for the six months ended October 31, totaled $10,266,039 or $3.29 a share on the 2,851,976 common shares outstanding, compared with $9,567,899, or $3.40 a share, for the corresponding period last year when 2,527,273 shares were issued. The increased number of shares is the result of the conversion of the $4 second preferred stock into common. Net income for the six months ended October 31, 1948, was reduced by approximately $1,300,000, through losses sustained as a result of the disastrous floods along the Columbia River in May, 1948. Sales of $85,049,716 for the period under review were an increase of 14 percent over the same period last year.

## New Container Line-Up

CHICAGO—The Container Corp. of America has made the following promotions, effective January 1:

Ira C. Keller and John V. Spachner, executive vice-presidents; Laurence T. McCurdy, James E. Purvis, Jack G. Robinson, Frank J. Sauer and John D. Spence, vice-president; Paul W. Guenzel, treasurer; Arthur R. Johnson, assistant treasurer.

The above individuals will continue to have the same duties and responsibilities as at present, with the exception of the new treasurer and assistant treasurer, who will have duties appropriate to their new offices.

## Oxford Advances Two

NEW YORK — T. L. Stirling, mill manager of the Oxford Miami Paper Co., West Carrollton, Ohio, has been appointed assistant to O. S. Barrie, manager of sales, Oxford Miami Paper Co., and western sales manager, Oxford Paper Co. Mr. Stirling will assume his new duties early in 1949 and will make his headquarters at the offices of the company, 35 East Wacker drive, Chicago.

P. L. Hovey will succeed Mr. Stirling as mill manager at West Carrollton. He has been connected with the Oxford Paper Co. since 1939.

## A. & S. Advances Two

CANAJOHAIRE, N. Y.—H. S. Hollingsworth has been appointed to succeed H. C. Peterson, Jr., as metropolitan area sales manager for Arkell & Smiths, multiwall paper bag manufacturer.

Mr. Hollingsworth is filling the vacancy left by the promotion of Mr. Peterson to assistant sales manager at the firm's general office here.

## Stream Improvement Meet

NEW YORK—The National Council for Stream Improvement, Inc., meeting at Hotel Waldorf-Astoria, February 21-23, has scheduled the following program, Russell L. Winget, executive secretary, reports:

*February 21*—Research group leaders' conference; *February 22*—Joint meeting, regional chairmen's committee and technical planning and budget committees; *February 23* — Annual meeting, board of governors; annual meeting, members (regulatory representatives and others will be welcomed at this meeting) and meeting of new board of governors. The Council will aid members in making hotel reservations upon written request to Mr. Winget, it is stated.

## Workers Awarded Pins

LEBANON, Ore. — Thirty-four employes of the Crown Zellerbach Corp. mill were presented service pins at a banquet and meeting at Melody Lane recently with approximately 80 employes, executives and representative business and professional men of the city attending.

The pins were presented by J. E. Hanny, vice president in charge of manufacturing for the company, following remarks by G. J. Ticoulat, manager of sales of the Crown Willamette Paper division of the corporation.

G. H. Galloway, resident manager, was chairman of the evening.

Frank J. Godfrey, tender for No. 1 machine, was presented a 35-year pin, and Charles Snyder and Jack E. Lanning 30-year pins.

## Jones to Springfield

SPRINGFIELD, Ore.—Marvin C. Jones has been named manager of the Weyerhaeuser Timber Co.'s sulphate pulp and container board plant. Mr. Jones plans to assume his duties shortly after January 1.

The kraft pulp and container board mill will convert wood not suitable for lumber into container board. Expected to start operation early next summer, it will get its raw material from sawmilling facilities on the same site, which will include dry kilns and a planing mill.

## Cromwell Sales Conference

CHICAGO — Phil S. Hanna, business columnist of the *Chicago Daily News*, was the principal speaker at a dinner for the sales managers of the Cromwell Paper Co. of Chicago, at the Standard Club, December 16. Representing nearly every section of the United States, they come here to attend a three-day conference conducted each year by officials of the company.

## DMAA Conference

NEW YORK — The annual conference of the Direct Mail Advertising Ass'n. will be held in Chicago at the Congress Hotel, September 21-23, Frank Frazier, executive director of the association, reports.

# Industry Forms NSRB Task Forces

NEW YORK—Discussing the National Security Resources Board - Industry Mobilization Plan, E. W. Tinker, in a letter to members of the American Pulp & Paper Ass'n., dated December 17 said:

"The hazard of a war at any time should not be discounted. Planning to meet such a hazard has a two-fold advantage. It may constitute the best insurance against war and it guarantees an adequate program of industry operation if a war does come, a program which could not possibly be formulated over night.

"Since the initial National Security Resources Board task group meeting of December 1 and 2 was held in Washington by representatives of the pulp, paper and paperboard industry, 'task groups' from the industry have been formed. Their reports will be worked up by the Pulp and Paper Section of the Forest Products Division of the NSRB, into an Industry Mobilization Plan, which in turn will be submitted to a representative Overall Advisory Committee before final submission to the NSRB Chairman.

"The task group will develop plans to obtain effective personnel to operate a Pulp, Paper and Paperboard Unit in an Office of War Production, and to secure adequate supplies of manpower, wood, logging equipment and transportation facilities. In conjunction with these plans, studies are being made of the control orders of the last war with the view to developing recommendations covering such controls as may be necessary, so that all segments of the industry will be able to carry their fair share of the war's burdens, and to produce the maximum tonnage of wood pulp, paper, paperboard and converted products needed for an all-out war effort.

"In the event of war, the National Security Resources Board will depend very heavily upon industry to help work out plans for its fullest participation in national defense, and both the country and the industry will have a much better chance of survival because of this present far-sighter planning."

## Pulp and Newsprint Up

OTTAWA—Canadian exports of newsprint paper dropped to $32,966,000 in October this year compared with $33,528,000 a year ago in the same month, but reached a total of $310,919,000 in the first ten months as against $283,125,000 in the corresponding period last year, according to the latest report of the Canadian Government. Exports of other paper from Canada also decreased in October, amounting to $2,613,000 as against $2,616,000 last year, though the total for the January-October period advanced to $27,880,000 compared with $25,097,000 a year ago.

Woodpulp exports from Canada increased to $17,217,000 in October against $16,703,000 in the same month last year and totalled $175,850,000 for the first ten months of the year compared with $145,496,000 last year. Exports of books and printed matter amounted to $303,000 in October against $383,000 last year and dropped to $3,855,000 for the January-October period compared with $4,607,000 a year ago.

## Slime Control Session

HAMILTON, Ohio.—F. A. Soderberg of the General Dyestuff Corp., New York City, was guest speaker at the December 2 meeting of the Miami Valley Division of the American Pulp & Paper Mill Superintendents Ass'n., Inc., at the Anthony Wayne hotel. Speaking extemporaneously with the help of notes and a blackboard on "Latest Developments in Slime Control," Mr. Soderberg took his audience of some 65 persons into partnership and formed a company for the sale of slimeicides to the paper industry.

In this imaginative setting, pertinent literature was reviewed, competitive products and practices were checked (no trade names were mentioned), several hypothetical visits were made to paper mills to survey existing conditions, and stress was placed on the advantages to be derived from good housekeeping.

## Swedish-Italian Treaty

NEW YORK—A Swedish-Italian trade treaty has been signed for the ten-month period December 1, 1948, to October 1, 1949, the American-Swedish News Exchange, Inc., reports, adding that "The exchange will take place on a barter basis, Italian exports consisting largely of textiles and the Swedish of forestry products. The most important Swedish export articles, primarily 50,000 tons of viscose pulp, 44,000 tons of paper pulp, and certain quantities on kraft paper and newsprint, will be balanced against Italian shipments of cotton yarn, artificial silk, cellulose textiles, etc. Sweden moreover will export iron and steel, engineering products, telephone and telegraph cables, automobile tires, and oranges, lemons, and almonds. In addition to this treaty some special agreements have been made, one for an Italian shipment of 4,000 tons of rice in return for Swedish seed grains."

The treaty aims at an exchange of trade amounting to 120 million kroner ($33,000,000) in each direction.

## Milk Container Plant

HOUSTON, Tex.—The American Can Co. will build Texas' first paper milk container manufacturing plant "at a cost of more than $500,000" in an addition to the company's metal can plant at Lockwood and Clinton streets.

Factory space to house the paper container machinery is now under construction by the W. S. Bellows Construction Co. as general contractors and the Mosher Steel Co. handling the structural steel. This and other expansion work will add approximately 50,000 square feet of floor space to the plant.

Principal materials used in the packages—paper and paraffine will be completely Texas-produced. Champion Paper & Fibre Co. of nearby Pasadena will use chips of Texas pine to produce sterile pulp which will be converted into fiber board.

## BOOSTING TISSUE PRODUCTION FOR B-F-D DIVISION

YANKEE 132-inch fourdrinier recently added to Diamond Match Co's., B-F-D Division at Plattsburgh, N. Y., has a capacity of 25 tons daily and will produce tissue for conversion into napkins and other products. . . . Beside machine are, J. O. Julson, general manager of paper and pulp operations, and Brandford O. Preu, vice president in charge of the B-F-D Division, and production personnel.

## Eight Finance Problems

NEW YORK—The American Management Ass'n. reported on December 17 that a survey of 1,200 executives representing companies of all sizes and types of industry taken to determine subjects for discussion at the annual meeting of its Finance Division in New York, January 20 and 21, shows eight current financial problems considered of major importance by American industry. These are: (1) The increasing difficulty of finding sources of funds to replace worn-out equipment at today's inflated prices and to provide for expansion. (2) Public misunderstanding of the true nature and size of profits under today's conditions, and the increased need for retention of earnings to provide for plant replacement or expansion. (3) Provision of adequate depreciation reserves under current tax laws and rising costs. (4) The economic and financial implications of the government defense programs and foreign aid, and of the trend of inflation. (5) The probable form and effects of future taxation. (6) Accurately planning and controlling inventories. (7) Quality of management as a consideration in extending credit by individual companies. (8) The uncertainty of the future trend of interest rates in view of predictions of a scarcity of capital and evidence of a trend toward debt financing.

At AMA's two-day Finance Conference, which will be held at the Hotel Statler under the direction of Murray Shields, AMA finance vice-president and vice-president, Bank of the Manhattan Company, more than 500 financial executives from all over the country will discuss economic guideposts for business planning, the future trend of interest rates, the public relations of profits, depreciation reserve policies, key factors in inventory planning, the probable course of taxation, the appraisal of management as a credit factor and sources of funds for current and future capital requirements.

Arrangements for the program are being made by Mr. Shields with the assistance of a committee which includes, among others, Malcolm S. Black, secretary-treasurer of the Union Bag & Paper Corp., New York.

## November Newsprint Data

NEW YORK—Newsprint on hand and in transit at the end of November, 1948, gave 36 days' supply for the average of all daily newspapers reporting to the American Newspaper Publishers Ass'n. This is the same number of day's supply as at the end of October, 1948. Stocks of 36 days at the end of November, 1948 compare with 33 days at the end of November, 1947; 31 days at the end of November, 1946 and 37 days at the end of November, 1945.

Many publishers, especially those using water-borne shipments from ports which are ice-bound during the winter months, build up their stocks of newsprint in the city of publication during the summer to carry them through the winter.

Daily newspapers reporting to the ANPA consumed 364,253 tons of newsprint in November, 1948, compared with 338,012 tons in November, 1947, and 291,517 tons in November, 1946. This was an increase in November, 1948, over November, 1947, of 7.8 percent and an increase over November, 1946, or 25.0 percent.

The total estimated newsprint consumption in the United States for November, 1948, was 476,148 tons which includes all kinds of uses of newsprint. For the first 11 months of 1948 it is estimated at 4,766,184 tons. During the first 11 months of 1948 the reporting newspapers used 3,646,131 tons of newsprint, an increase of 12.4 percent over the first 11 months of 1947 and an increase of 28.3 percent over the first 11 months of 1946.

## A TIME FOR DECISION

"Certainly we need that new equipment—but this is a hell of a way to decide if we get it or not!!"

*—Elliott Co. "Powerfax"*

## Canadian Stocks Down

OTTAWA — Common stocks of pulp and paper dropped from 269.4 in September to 266.9 in October for a loss of 2.5, with among the principal changes involved being increases for Hinde & Dauch and losses for St. Lawrence Corp. and Dryden Paper, on the base of 1935-1939 equals 100, according to the latest report of the Prices Branch of the Canadian Government.

## Tasmanian Output Upped

OTTAWA—Canadian machinery recently secured will raise the newsprint output of Tasmanian mills from 31,000 to 81,000 tons in the next two years. Canadian logs and sulphite will be shipped to Britain and there turned into newsprint. This is expected to give Australia 20,000 tons of newsprint in 1949 for a minimum expenditure of dollars.

## U. S. Imports-Exports, Oct.

WASHINGTON—A gain in newsprint imports in October over September, as well as compared with October a year earlier, was reported by the Department of Commerce this week.

Imports for October totaled 725,000,000 pounds, against 699,000,000 in September, and 711,000,000 a year earlier, and the 1947 monthly average of imports aggregating 660,000,000, said the Department.

Woodpulp imports this October declined to 149,000 tons from 155,000 in September, and 198,000 in October 1947. Woodpulp exports in October amounted to 1,591 short tons, compared with 423 tons in September and 16,090 tons in October a year ago.

Exports of paper and paper manufactures rose to $9,500,000 in value for October, from $7,900,000 in September, but were under the $13,300,000 reported in October a year ago.

## Suspending Prohibitions

OTTAWA—With continued improvement in the United States exchange position, the Canadian Government has passed an Order-In-Council enacting that present import prohibitions will be suspended effective January 1, on towels, napkins, table covers, tray covers and doilies, of paper; sandpaper, glass or flint paper, and emery paper or emery cloth; fancy shelf and lace papers; paper handkerchiefs; facial tissues and toilet paper, including such materials in jumbo rolls, and paper hanging or wall papers, including borders or bordering, though the last mentioned would be subject to quota. Fnnance Minister Abbott said it is expected that continuing improvement in exchange position would make possible further substantial relaxations from time to time throughout 1949.

## NACE Conference-Expo

NEW YORK—The fifth annual Conferenco and Exhibition of the National Ass'n. of Corrosion Engineers will be held April 11-14, at the Netherland-Plaza hotel, Cincinnati.

The technical program will include symposia on Corrosion Principles, Cathodic Protection, Chemical Industry, Communications and Electrical Industries, Gas Industry, General Industry, Oil Industry, Protective Coatings, Pulp and Paper Industry, Salt Water Corrosion, and Transportation Industry, with papers by authorities in these fields. The Exhibition, with displays by various manufacturers, will show the latest methods, materials, equipment and services for combating corrosion.

## AWP Rumor Denied

HOLYOKE, Mass.—Reports that Sherman H. Bowles, Springfield newspaper publisher, had taken over the Riverside Division of the American Writing Paper Corp., were denied Dec. 13 by Edward C. Reid, vice-president of American Writing and by Mr. Bowles.

# Handling Costs Are Climbing

**By EDWIN CHESTER HASTINGS**
**Edwin Chester Hastings Traffic Service, Pittsburgh, Pa.**

It may not seem possible for the charges at rail terminals to increase over four years to 241 percent and 271 percent. These increases that have risen rapidly are for services that sometimes cannot be avoided. These are extra charges in addition to the transportation rates. The list of cities to which they apply may be better described by saying that the area covers all the eastern part of the United States, east of Houston, Texas, the Mississippi River and Minnesota. Here is how it works:

A paper company receives one or several orders for the same city, one mill exhausts the excess stock and the balance of the order is filled from another mill of the same company in another city. The more distant mill fills part of the car and has the partload stopped in transit. For this stop the charge to finish the load is $11.26. The mill where the stop is made trucks to the loading point. Large rolls of paper that require the use of a crane or derrick are subject to handling charges. Paper being subject to easy injury can't be rolled and in most cases the big objects have to be lifted. It is this lifting service that has increased so rapidly. These are the days when it is easy to give a reason for higher prices. The "reason" can be charged to materials, labor, and transportation. The only item the carrier can sell is transportation, that is the only "material" it "manufactures." The carrier gives as the reason for requests for increases that the price of raw and finished materials it must buy have increased; to replace equipment, the carriers have to pay more; its labor costs have gone far beyond the reasonable point, it is claimed. The only income a carrier has, is from the transportation he sells, this means he has certain rates, some low and some high. When one rate doesn't pay the way, another that draws more revenue help to support the weak rate.

There are, however, some rates that are in a class of their own and to this special class one can apply "handling charges". The service in 1944 cost 3¾ cents per cwt or 75 cents net ton for lifting and transfering car-to-car; 4¾ cents per cwt or 95 cents net ton for the same service truck-to-car. Today this cost has risen to 203 cents and 229 cents per ton. This means the 3¾ cents has risen to 10 1/5 cents per cwt or 271 percent. The 4¾ cents has risen to 11½ cents, or 241 percent.

What reason is there for the increases? Most rail terminals have obsolete equipment, except Chicago, New York and a few other large cities. Many small towns are using equipment over 30 years old. In the large cities where new equipment has been installed, this has removed the need for six men and ten-man crews and made possible for two men with proper equipment to do more than the older crews in less time.

Freight handling as a vocation doesn't attract enough men so as to have a pool of extras to use in rush periods. The work is hard and the pay low. A great deal of the work is in the open and the bitter weather takes a toll. The carriers have a problem to keep men and jobs go begging. Previous to 1944, these men received 58c-64c an hour, the rate in 1944 became 68c-73c. Their present rate is 98-107 cents. If one used the 64-cent rate as a base, the percentage matched with today's rate wouldn't double. In simple words, these men are not receiving twice what they received in 1941, the 58-cent rate. Since the handling increase of 241 percent and 271 percent is based on 1944-1948, the same can be done with the labor rate of 73 cents increased to 107 cents, that only is an increase of 47 percent.

What justification, then, do the carriers have for their increase when only a small percentage of the amount can be charged to labor increases and mostly zero when operating equipment is considered as a cost factor? The answer seems to be that handling costs have to help pay losses incurred elsewhere.

**MOTOR TRUCK TAKES DAILY BEATING**

DIAMOND T. 509H motor truck makes short shift of tough job with this pulp wood rig in steady use by a wood cutter in Northwestern Pennsylvania.

## ECA Exports Rise

WASHINGTON — This country's exports to ECA countries rose to $330,600,000 in October from $324,300,000 in September, the Bureau of Census reported this week.

Norway and Denmark were among ECA participant countries showing gains, the former having reported exports from this country of $8,700,000 compared with $6,900,000 in September; and Denmark, with Faroe Islands, $7,400,000 and $3,700,000 for October and September respectively.

Exports to Sweden dropped to $7,900,000 in October from $8,500,000 in September.

## Specifications Available

WASHINGTON—Specifications for the joint Army-Navy packaging operation are now available by writing to the Government Printing Office here. Specifications are as follows: JAN-P-125, barrier Materials, Waterproof; JAN-P-117, Bag and Interior Packaging; JAN-B-121, Greaseproof Barrier Materials; JAN-P-131, Barrier Materials, Moisture - Waterproof; UUP-268-B, Kraft Wrapping.

## Canadian Price Index

OTTAWA—The wholesale price index for newsprint and wrapping paper stood at 134.8 in October this year compared with 122.4 in October a year ago, on the base of 1926-equals-100. The wholesale price of pulp stood at 195.8 in October as against 190.8 in the same month last year, the Prices Branch of the Canadian Government reports here.

# China to Buy More Woodpulp Abroad

**By R. I. RANKIN**

SHANGHAI—Allocations for the purchase of woodpulp have been increased, in accordance with the expressed intention of the Chinese Government to manufacture more paper in this country and to reduce its imports of the finished product. Allocations for the importation of fine paper have been reduced proportionately. Approximately, 8,500 metric tons of woodpulp were imported last year, and it is expected that purchases for 1948 will be higher.

Imports for 1935-37 averaged approximately U.S. $600,000 a year, or about 14,000 metric tons, of which 90 percent consisted of chemical pulp and ten percent mechanical pulp. The United States was the principal source of supply, averaging slightly less than 40 percent of the total, while purchases from Scandinavian countries represented 30 percent. During 1937, the peak year, imports reached 16,000 metric tons, but dropped to only 1,900 metric tons the following year, due to the outbreak of hostilities and the disruption of paper production along the coastal area. Thereafter, the demand for pulp gradually increased again, and imports rose to about 2,800 metric tons in 1939 and to 7,300 metric tons in 1940.

Due to the fact that most of the prewar paper mills in China were not destroyed during the war, except for a large newsprint mill in Canton province, as well as the addition of a number of small paper mills established in the interior during wartime and the acquisition of important paper mills in Formosa, postwar pulp requirements are potentially larger than prewar imports. However, in 1946, due to unrestricted import of paper from abroad, many local mills had to curtail production. In that year, roughly 7,500 metric tons of pulp were imported, of which the Scandinavian countries supplied about 69 percent. Due to controls in the United States, shipments from America represented only 27 percent, or about 2,000 tons. During 1947, imports increased to about 8,300 metric tons, of which the Scandinavian countries supplied roughly about 46 percent of the total, or about 3,800 tons, and the United States shipped about 3,200 tons, or almost 38.5 percent of the total. During the first five months of the year, pulp imports amounted to roughly 7,000 tons, but quite a large percentage of this tonnage must be regarded as orders which were booked against 1947 import quotas.

### Import Quotas Issued Direct to Mills

Import licenses are issued directly to the paper mills, the individual amount being based on the mill's past production records. Although the Export-Import Board's total 1948 import quota for woodpulp has not yet been decided, it is estimated that the total exchange allocated will amount to roughly U.S. $1,500,000. The latest quota, i.e., the fifth, was about U.S. $350,000. Present requirement for imported pulp, based on prewar and present paper production, is very roughly estimated to be about 20,000 tons annually. It is expected that the Board will eventually allow special imports of pulp, to be used by paper mills aginst export of their paper products. Such a measure would naturally increase the quantity of pulp that may be imported.

Customs duty for woodpulp, either chemical or mechanical, has in the past been levied at five percent ad valorem. However, the present rate of duty, as per new customs tariff promulgated August 2, 1948, and effective August 7, 1948, has been increased to ten percent ad valorem. The same duty rate is levied on other types of pulp, such as bamboo, hemp and flax pulp, but imports of these types are negligible. It should be noted, however, that increase of duty will not affect imports, as at present import quantity is determined by import licenses rather than by the amount of duty payable. This new tariff, however, is not applicable to countries which have enforced the Protocol of Provisional Application of General Agreement on Tariffs and Trade, of which Canada is one.

Definite statistics are not available of China's production of woodpulp, and the following comments must also include pulp production from bamboo, hemp, reeds, straw, sugar cane bagasse.

There are in various parts of China large tracts of timber suitable for the manufacture of pulp; but the industry is not well developed. Aside from lack of political and economic stability required for the development of any large manufacturing enterprise, one of the most important factors hindering the development of the Chinese pulp industry is the lack of cheap transportation. Most of the larger and more modern paper mills are located in the coastal areas, whereas suitable timber (for which modern logging and conveying equipment is also lacking) for pulp has to be obtained from almost inaccessible areas in the interior. Another important factor is lack of a large basic-chemical industry to supply cheaply and in abundance the large quantities of chemicals required for the manufacture and bleaching of chemical pulp, whether by sulphite, sulphate or soda process. The Yug Li Chemical Works and the former Japanese Alkali Works in Formosa are producing caustic soda, but production is only enough to meet present general industrial requirements.

During the war, a pulp mill was established in Szechuen province at Imping. This mill is at present still in operation but production is limited. Another plant was established in Kweilin, in Kwangsi province, but had to be dismantled during the Japanese advance in that area, and has not yet resumed operation. In recent months there have been preliminary negotiations for the establishment of a modern pulp mill in Fukien with the cooperation of the provincial authorities. The plan is to utilize Foochow pine timber from the upper reaches of the Ming River. However, no preparations for actual establishment have been made.

The total forest area of Manchuria is estimated to cover 260,000 square kilometres, or about 36 percent of the entire area. The volume of standing timber is conservatively estimated to be 90 billion cubic feet. This abundance of available timber, combined with good hydro-electric resources, makes the northeast a very suitable area for large scale development of the pulp industry. The first important pulp mill was established in 1919, with an initial annual production of 12,000 metric tons. From then on, total Manchurian pulp production was increased continuously and reached a peak output of about 100,000 tons annually. Around 1930, Japanese interests started quantity production of reed and hemp pulp. After V-J Day, due to continuous fighting, production has been almost entirely stopped. However, under National Resources Commission (NRC) control, about 1,200 tons per month of non-wood pulp, consisting of about 85 percent reed pulp and 15 percent hemp pulp, is still being produced.

## Power Cut Cuts Output

THREE RIVERS, Que.—Curtailment of electric power made necessary by shortage of water threatens sharp reduction in newsprint production during the next few months. The Shawinigan Water & Power Co. here has reduced power available to local plants by ten percent. In some areas power reduction may run as high as 25 percent.

The situation not only means a curtailment in the output of newsprint but may mean production of an inferior quality of paper for the next few months. By reducing the processes entering into the production of first class newsprint the companies may save power without proportionately reducing output.

Power curtailment is expected to continue through the winter until April.

# Timber Said to be Abundant Near Houston, Texas

HOUSTON—E. L. Summers, agriculture editor of the *Houston Chronicle,* stated in an article published recently in that newspaper that there is enough standing timber around Houston to make an estimated 200,000,000 cords of wood.

"According to the Texas Forest Service at A. & M. College, officials of the Champion Paper & Fiber Co., and others, this great volume of wood —which by the way is not all used for cordwood—lies within 175 to 200 miles of Houston," Mr. Summers wrote.

"The wood in this area, according to D. A. Anderson, acting director of the Texas Forest Service, is about 60 percent pine and 40 percent hardwood.

"Frank Boyce, manager of the wood department of the Champion Paper & Fiber Co., thinks the supply of wood is well nigh inexhaustible.

"From the best estimates and guesses available the wood is being consumed at the rate of about 2,000,000 cords annually. At that rate, it would appear it would take 100 years to burn up or use all the wood, providing no more grew.

"But the facts are that a pretty sizable crop of hardwood can be grown in 50 years, and pine requires much less time.

"The biggest bite into the Houston area wood supply is being made by the lumbering interests, which according to Gene Ebersole, are turning out 1,500,000,000 board feet of lumber per year. Mr. Ebersole is executive vice-president of the Lumberben's Association of Texas.

"The Champion paper mills are using about 900 cords per day—90 percent pine and ten percent hardwood—and this stacks up close to 300,000 cords per year.

"There are other paper mills in the Houston area, especially the newsprint mill at Lufkin, and they probably consume another 300,000 cords, or perhaps less.

**Where Wood Is Located**

"Mr. Anderson says there are 117,000,000 cords in the counties of Houston, Angelina, San Augustine, Jasper Newton, Polk, Tyler, Trinity, San Jacinto, Hardin, Orange, Harris, Waller, Grimes. Montgomery and Liberty.

"He guesses there is fully half as much or nearly 60,000,000 cords in the lower Gulf Coast counties of Brazoria, Matagorda, Galveston, Fort Bend, Colorado. Victoria, Jackson, Wharton.

"He says the Forestry Service will know about the lower coastal counties after a timber survey which he hopes will be launched soon.

"There are possibly 20 to 30 million cords in the "smaller oak" counties not mentioned by Mr. Anderson, but lying within a 200-mile radius of Houston."

## Canada's Tenth Province

OTTAWA—Canada and Newfoundland on December 11 signed the terms of union by which the latter will become a province of Canada. The agreement must now be approved by the Canadian Parliament and the Government of Newfoundland and confirmed by the Parliament of the United Kingdom. It is hoped that the formal act of union will be completed by March 31, next.

One member of the Newfoundland delegation, Chesley Crosbie, did not sign. On December 9 he declared himself dissatisfied with the financial terms of the agreement, which, he said, fell short by $8,000,000 of the amount of assistance that Newfoundland would need during the first years of the union. He left Ottawa on December 11 before the ceremony to make a business trip to the United States and on his return to Newfoundland he will present a minority report to the present Governor, Sir Gordon MacDonald.

Broadly speaking, Newfoundland will become a province of Canada on the same terms as all the others in that it will have full local self-government and its own legislature which will have the responsibility of providing the major public services.

The government of the province, when constituted, will be asked to enter into an agreement with the Government of Canada regarding the income tax, corporation tax and succession duties.

Canada also assumes and provides for the servicing and retirement of the Newfoundland debt, amounting to about $63,000,000.

In a short speech following the signing, Prime Minister St. Laurent said: "Our primary concern has not been for the narrow advantage of each but to assure our common interests in one enlarged nation.

# Fewer Fires in National Forests

WASHINGTON — With the country's 1948 forest fire season ended by late fall weather or rains everywhere but in the Deep South and southern California, the Forest Service in the U. S. Department of Agriculture, on December 9, reported a 28 percent decrease in the number of forest fires on National Forests this year as compared with the number in the same period of last year.

A total of 7,821 fires occurred in these forests during the season just closed; 2,963 fewer than in the same period of 1947, and 2,694 below the average for the past five years, 1943-47. Of the 1948 season's fires, 4,951 were man-caused, as compared to 6,351 man-caused fires during the 1947 season, and to an average of 5,676 for the last five years.

Also down, according to Carl A. Gustafson, fire control chief of the Forest Service, was the area burned by forest fires on the 152 National Forests, the burned over area dropping from 245,693 acres last year to 160,867 this year, a decrease of about 35 percent.

The National Forests of the 11 states south of Virginia (Forest Service Region 8), where woods burning has always played an important part in the forest fire problem, reported the largest decrease in man-caused fires as compared with other regions. The drop was from 3,078 during the 1947 season to 1,953 for the season just closed. The southern region, however, reported the largest number of fires, the number from al causes being 2,146, a drop of 1,100 from the comparable figure for 1947. The largest acreage burned-over among the regions was in California (Forest Service Region 5) where during the past season 936 fires—721 man-caused—burned-over 50,339 acres.

*Note:* The above statement applies only to forest fires in National Forests. Reports on total forest fire losses will be available in several months.

## Shortage Self-Imposed?

LONDON—Britain suffers from an unnecessary newsprint "famine," Edgar Granville, Liberal member of Parliament, said in a speech at Suffolk recently.

"The serious, immediate need is for more and bigger papers, books and periodicals if we are to avoid democratic anemia," he declared.

"If we can afford to pay dollars for phoney films, big fight flops, and second-rate Hollywood variety turns, we can afford more newsprint now." He added that the Government, through its refusal to allow imports of sufficient newsprint, was in process of "creating a hybrid state, half fettered, half free."

## Papercraft Xmas Party

PITTSBURGH—The Gold Room of the Roosevelt Hotel was the scene of the annual employes' Christmas party of the Papercraft Corp., December 18.

## Patterson Appoints Kelley

EAST LIVERPOOL, Ohio — Joseph W. Kelley has been appointed division sales manager of the special equipment division of the Patterson Foundry & Machine Co.

### Normal Differentials

NEW YORK — "All industry is presently going through a period of readjustment and the pulp and paper industry is no exception. What is occurring is a return *to normal differentials for different grades and qualities,*" James Donaldson, president of the Ass'n. of American Wood Pulp Importers, told *Paper Trade Journal* on December 23.

"If, for example, unbleached sulphite prices are reduced to reestablish the normal differential with bleached sulphite prices, it does not mean prices are tumbling because of any extreme market weakness," Mr. Donaldson pointed out. "Producers are simply getting their position properly reestablished for the long pull ahead wherein we will have normal competition. Scandinavian prices are likewise being readjusted in order to narrow the wide gap that has existed during the past few years between their prices and those of North American producers.

"Actually, from an overall world position, the outlook for the woodpulp market in 1949 is excellent and partly for the very reason prices are now getting in line with the proper post war value of all inflated currencies. The unfortunate attitude that business is not booming on a seven-day operation basis means we must be headed for a bust, is today primarily due to the fact there has been too little real thinking applied on any of our problems during the past few years. It is now time to stop talking unwisely and apply a little real thinking to get the right perspective on the overall picture of our industry. The outlook is good."

### Felt Mill Starts Jan. 3

MOREHEAD CITY, N. C. — Otto A. Sandusky of the Southern Felt Corp., writing on the letterhead of the Madix Asphalt Roofing Corp., told *Paper Trade Journal:* "We expect to get our new felt mill into operation by January 3. We will manufacture lightweight and heavyweight dry roofing felts that go into saturated felts for asphalt roll roofing, asphalt shingles and asphalt brick siding. We will also make lightweight bogus papers to be saturated into mulch papers and saturated building papers."

### Marcal Names Schmitt

PATERSON, N. J.—J. J. Schmitt has been appointed chain store sales manager of paper products by the Marcal Paper Mills, Inc.

### Enlarging Box Plant

LEASIDE, Ont.—The Corrugated Paper Box Co., is erecting a one-story, 10,000 sq. ft., steel and brick addition to its plant.

# NPTA Answers FTC Complaint

WASHINGTON — The National Paper Trade Ass'n. on December 28 filed with the Federal Trade Commission an answer denying categorically the charges of violation of the Federal Trade Commission Act alleged in the complaint of the Commission released on October 26. The answer, signed by Ralph G. Luff, of Philadelphia, as president, and Benjamin A. Javits, Selig J. Levitan and Harold Held as counsel, asserts that free, open and active competition exists within the paper distributing trade and between members of that trade and direct selling mills, brokers, wholesale grocers and others.

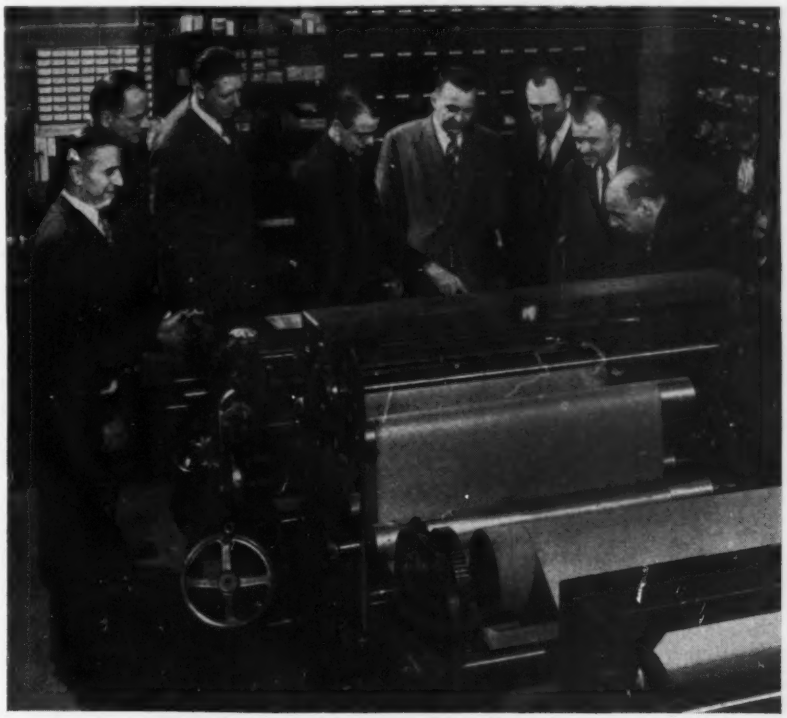
In answer to the charge that monopolistic tendencies were being promoted, the Association asserts that since 1920 the number of paper merchants has more than doubled, that price variations—rather than price uniformity—have characterized the trade, and that the entire membership distributes approximately one-seventh of the total domestic consumption of fine and wrapping paper tonnage.

The FTC complaint was directed against the National Paper Trade Ass'n., 23 constituent associations located in various parts of the United States, east of the Rocky Mountains, 94 specifically named companies, and approximately 1,000 members. The files of the Commission indicate that more than 100 independent answers have been received in addition to the answer of the National Association. Release of the complaint was followed by a hearing before the Commission on November 16 on a set of Fair Trade Practice Rules proposed by the NPTA.

The National Paper Trade Ass'n. was founded in 1903. The answer of the Association asserts that the Association extended active cooperation to the Government during the NRA period and during the two war periods.

### Jurisdiction Challenged

WASHINGTON — The J. W. Butler Paper Co. (Inc.) of Illinois, and the Case Paper Co. of New York City, have filed separate motions to dismiss the complaint of the Federal Trade Commission against the National Paper Trade Ass'n. and approximately 1,000 merchants, alleging lack of jurisdiction on the part of the Commission and charging that the complaint is "set forth in such general and vague terms as to make it impossible" to answer "fairly and fully."



**NEW MACHINE FOR COATING PAPER**

**Industrial Ovens, Inc., district engineers attending a sales engineering conference at Cleveland, are shown inspecting a newly designed machine for coating paper, textiles, film and foil. . . . Pointing out its features is C. A. Litzler, president. Others in the picture are (left to right): A. H. Kruger, district engineer, Chicago; J. R. Hall, general manager, Cleveland; V. C. Leatherby, district engineer, Pittsburgh; J. K. Gillett, sales engineer, Cleveland; J. P. Clark, Jr., district engineer, Philadelphia; R. B. Symons, New England district engineer, Tiverton, R. I.; and E. V. Larson, district engineer, Toronto.**

# International Names Doane
## Vice-President in Charge of Sales

NEW YORK — Richard C. Doane was elected vice-president in charge of sales of the International Paper Co., at a directors' meeting on December 28, John H. Hinman, president, revealed to *Paper Trade Journal* at the close of the meeting.

Mr. Hinman stated that Mr. Doane is returning to New York from Montreal and is resigning as vice-president and general manager of the Canadian International Paper Co.

Mr. Doane joined the International Paper Co. sales department in 1924 and became assistant to the sales manager in the next year. In 1928 he was appointed manager of the Newsprint Division and in 1929 vice-president of the International Paper Sales Co., Inc. In 1938 he moved to Montreal, and in 1941 was elected president of the sales company. He was also a vice-president and a director of the Canadian International Paper Co. and in 1947 was appointed general manager.

### Can. Paper Imports

OTTAWA—Canadian importations of paper declined to $1,452,000 in October, 1948, compared with $2,278,000 in the same month a year ago and slumped down to a total of $14,331,000 in the first ten months of 1948 ending October, as against $19,511,000 in the corresponding period in 1947, according to the latest report of the Canadian Government, with imports of books and printed matter also declining to $3,014,000 in October, 1948 against $3,215,000 a year earlier and totaling $25,779,000 in the January-October period of 1948 compared with $26,667,000 in the same period a year earlier.

However, this report points out that current post-war imports of paper are still running ahead of the last complete pre-war year, 1938, when such imports amounted to only $711,000 in October and totalled merely $6,276,000 in the first ten months of that year, with books and printed matter amounting to $1,517,000 in October and $12,551,000 in the first ten months of that year.

### Chemical Output Up

WASHINGTON — Sizable increased production for chlorine, synthetic soda ash, caustic soda, salt cake, and a number of other chemicals occurred in October compared with September, the Bureau of Census reported in mid-December.

October production compared with September showed the following, respectively: chlorine, gas, 147,593 short tons and 136,382; soda ash, ammonia soda process, total wet and dry, 406,603 short tons and 357,618; natural, 25,328 short tons and 24,712; caustic soda, electrolytic process-liquid, 144,380 short tons and 133,986; solid, 29,318 and 29,206 short tons; lime-soda process, liquid, 67,456 short tons and 62,177; splid, 23,532 short tons and 22,187; salt cake, crude, 60,674, and 57,581 short tons.

### Lily-Tulip Elections

NEW YORK—Four executive changes have been announced by the Lily-Tulip Cup Corp., effective January 1, as follows: C. W. Gray-Lewis, treasurer, has been elected a director; Walter E. Amberg, formerly a vice-president of a subsidiary company, has been elected vice-president in charge of product development; Robert H. McKenna, formerly assistant to the president, has been elected a vice-president, and H. L. Fleischmann has been elected secretary to fill the vacancy caused by the resignation of Samuel Franklin, who remains a director.

### Container Elections

CHICAGO—Ira C. Keller and John V. Spachner have been named executive vice-presidents of the Container Corp., of America; Laurance T. McCurdy, James E. Purvis, Jack G. Robinson, Frank J. Sauer, John D. Spence, vice-presidents; Paul W. Guenzel, treasurer; and Arthur R. Johnson, assistant-treasurer.

### Trends

*(Continued from page 28)*

tion equipment was up 5 percent after being curtailed by the auto-suppliers' strike in September. Production of selected nondurable manufactures show textile production, after recovering part of its summer drop, decreased again in October. Petroleum output increased about 9 percent, following settlement of the west coast strike. Food products and chemicals showed no change . . . *New construction* in November showed a continued decline in volume which was more than seasonal. Housing starts dropped sharply in October to 72,000, about 22,000 under the total for October of last year, the peak month of 1947. Expenditures for new plant and equipment for nonagricultural business will probably be 15 percent more this year than in 1947. Business plans for 4th quarter show a decline of about $1 billion (annual rate) from 3rd quarter, with most of the decrease in expenditures for manufacturing construction . . . *New corporate security issues* in 3rd quarter of 1948 were below those of the previous quarter but at the same rate as a year ago. Three-fifths of the proceeds were earmarked for plant and equipment . . . *Retail sales* through October failed to show the usual fall seasonal rise . . . *Exports* in October recovered to the July level while imports also rose, though by a smaller amount.

#### Purchasing Power

Compensation of employees rose $6.4 billion (annual rate), and farm income dropped $1 billion during the 3rd quarter, according to revised estimates . . . Corporate profits so far this year are running above 1947 levels. Higher personal income in October reflects a greater volume of marketing of farm products and longer working hours per week in durable goods industries . . . Consumer income in the 3rd quarter increased more than expenditures. The proportion of income saved appears to be substantially above a year ago . . . Real purchasing power per capita for the 3rd quarter changed little from the average for the first half of 1948 . . . Personal consumption expenditures increased $2 billion (annual rate) in the 3rd quarter, according to revised estimates. The increase resulted from more expenditures for durables and services . . . Increase in *consumer credit* from the end of September to the end of October was attributable to the seasonal increase in charge accounts.

#### Money, Banking, etc.

Since the middle of the year bank loans have been rising at a significantly lower rate than last year. In October there was even a slight decline below the September level. In October the volume of demand deposits and outstanding currency continued below the level of a year before. The $1.3 billion excess of Federal cash receipts over cash payments for the 3rd quarter of the calendar year 1948 was just above the 2nd quarter excess.

#### Indexes

Index of general business activity for the week ended December 18 eased to 155.4 from 156.5 in the preceding week, compared with 155.8 in the corresponding week of 1947.

Index of paperboard production declined to 196.1 from 199.1 in the preceding week, compared with 184.2 in the corresponding week of 1947.

Comparative ratios of U. S. paper and paperboard production to mill capacity, as reported by AP&PA are:

| | Dec. 18 1948 | Dec. 11 1948 | Dec. 20 1947 | Dec. 21 1946 | Dec. 22 1945 |
|---|---|---|---|---|---|
| Paper** ..... | 96.1 | ‡98.2 | 107.2 | 101.8 | 96.5 |
| Paperboard ... | 96.0 | 96.0 | 100.0 | 102.0 | 92.0 |

** Indicates 1948 volume of 173,095 tons. Comparable week, 1947, 169,894 tons. ‡ Revised figure.

**Paperboard Production (Tons)**

| | Dec. 18 1948 | Dec. 11 1948 | Dec. 20 1947 |
|---|---|---|---|
| Production ..... | 194,508 | 198,237 | 183,641 |
| New Orders ..... | 155,409 | 210,641 | 157,585 |
| Unfilled Orders ... | 324,804 | 363,813 | 416,851 |

Percent of Activity, Current 96%; Year, 96%.

## Brooklyn Firm Expands

BROOKLYN, N. Y.—William W. Fitzhugh, Inc., folding box and label manufacturer, has formed a division for the manufacture of corrugated containers and die-cut specialties. Operations are based on purchase of the assets of the Continental Container Corp., Inc. Machinery includes a Hooper corrugator and full converting equipment. C. O. Kreegar, formerly with Container Corp. of America, Anderson, Ind., is production manager, and E. G. Kauffman, formerly with the Pennsylvania Fibre Box Co., Inc., of Royersford and Philadelphia, is in charge of sales.

## Sherman Bag Innovation

UPPER NEWTON FALLS, Mass.—Sherman Paper Products Corp., is manufacturing a large, flat-topped bag with a sealed bottom. An accordion pleating operation turns out bags in various sizes up to 60 inches high and 24 feet in circumference. The bag is delivered in folded form, six inches wide. An air vent in each corner is designed to escape pocketed air without permitting dust or other contamination to enter the bag. The bag is manufactured on a machine developed by Sherman personnel.

## Bowater's Output Boost

ST. JOHN'S, N. F.—Production in Bowater's Newfoundland Pulp & Paper Mills will be boosted by about 100,000 tons of newsprint annually when a new paper machine begins operation at Corner Brook within a few weeks. This is a 284-incher with a trim of 266 inches designed for an ultimate speed of 2,000 feet a minute. To keep it rolling, more than 100,000 cords of pulpwood must be cut in addition to the 400,000 cords needed by the present mill.

## Millar Xmas Bonus

NEW YORK—Employes of Geo. W. Millar & Co., Inc., paper merchant firm, were presented with their usual Christmas bonus again in 1948—four weeks pay—distributed on December 20. James F. Levens, president of the company, in making the announcement, emphasized that the bonus is over and above company contributions to the pension plan, profit-sharing fund and for group life insurance, maintained without expense to the employees.

## Mersey Mercy Champs

LIVERPOOL, N. S.—The Mersey Paper Co. first aid team, which for the third year in succession, has won the provincial championship of the St. John Ambulance Brigade, was presented with its thrice won trophy on December 14. The team includes H. E. Arthur, captain; F. H. Burrows, A. E. Fox, G. A. Cameron, L. J. Torrello and C. A. Kennedy.

## In New Quarters

NEW YORK—The Virginia Smelting Co., has removed its offices to 270 Madison avenue. Telephone, OREgon 9-1131.

## St. Louis Men Upped

ST. LOUIS—W. W. Cassidy, formerly vice-president, has been named president of the American Folding Box Co., succeeding Charles E. Carey, named chairman of the board. C. A. Augustin, vice-president, has been elected to the board of directors.

## Increases Dixie Holdings

C. L. Van Schaick, executive vice president and director of the Dixie Cup Co., is reported to have bought 700 shares of his firm's common stock in October and to now hold 1,000 common shares and 80 A shares.

## Western Plywoods, Ltd.

NEW YORK — Western Plywoods, Ltd., is reported to be the firm contemplating establishment of a pulp mill in Quesnel, B. C., as stated in "It is rumored that—" column on page 9 of the December 9 issue of *Paper Trade Journal.*

## Smith Moves Warehouse

ALBANY, N. Y.—The W. A. Smith Paper Corp. is moving its warehousing facilities from 322-324 Broadway to 212 Sheridan acenue but its offices will continue on Hudson avenue, the company discloses.

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## AMERICAN PAPER AND PULP ASSOCIATION'S PRODUCTION RATIO REPORT*

(Production as per cent of six-day capacity)

### COMPARATIVE WEEKLY SUMMARIES

| Current Weeks—1948 | | Corresponding Weeks—1947 | |
|---|---|---|---|
| November 13 | 99.6 | November 15 | 109.1 |
| November 20 | 99.4 | November 22 | 111.9 |
| November 27 | 93.0 | November 29 | 107.4 |
| December 4 | 95.4 | December 6 | 112.1 |
| December 11 (Revised) | 98.2 | December 13 | 110.1 |
| December 18 | **96.1 | December 20 | 107.2 |

### COMPARATIVE MONTHLY SUMMARIES

| 1947 | | | | | | 1948 | |
|---|---|---|---|---|---|---|---|
| Jan. | 102.1 | May | 106.2 | Oct. | 109.5 | Jan. | 100.3 |
| Feb. | 105.9 | June | 106.2 | Nov. | 109.3 | Feb. | 99.8 |
| Mar. | 106.1 | July | 95.5 | Dec. | 101.5 | Mar. | 100.8 |
| Apr. | 105.1 | Aug. | 104.2 | | | Apr. | 100.8 |
| | | Sept. | 102.0 | Year Avg. | 104.3 | May | 100.5 |
| | | | | | | June | 95.7 |
| | | | | | | July | ‡88.1 |
| | | | | | | Aug. | ‡96.8 |
| | | | | | | Sept. | ‡91.8 |
| | | | | | | Oct. | ‡99.1 |
| | | | | | | Nov. | ‡97.3 |

‡ Preliminary Ratios.

### COMPARATIVE YEARLY SUMMARIES

| | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 |
|---|---|---|---|---|---|---|---|---|
| Year to Date | 97.3 | 90.7 | 88.1 | 88.6 | 89.9 | 101.6 | 104.9 | *97.1* |
| Year Average | 97.4 | 90.4 | 87.8 | 88.1 | 89.4 | 101.1 | 104.3 | |

** Indicates 1948 volume of 173,095 tons—Comparable week 1947—169,894 tons.

### PAPERBOARD OPERATING RATIOS†

| Current Weeks—1948 | | Corresponding Weeks—1947 | |
|---|---|---|---|
| November 13 | 96 | November 15 | 101 |
| November 20 | 97 | November 22 | 102 |
| November 27 | 89 | November 29 | 100 |
| December 4 | 93 | December 6 | 98 |
| December 11 | 96 | December 13 | 100 |
| December 18 | *96* | December 20 | 100 |

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Year Avg. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1947 | 99 | 103 | 101 | 100 | 101 | 101 | 90 | 99 | 96 | 101 | 99 | 89 | 98 |
| 1948 | 99 | 100 | 102 | 102 | 100 | 94 | 81 | 92 | 91 | 96 | *94* | | |

* Based on tonnage reported to American Paper & Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

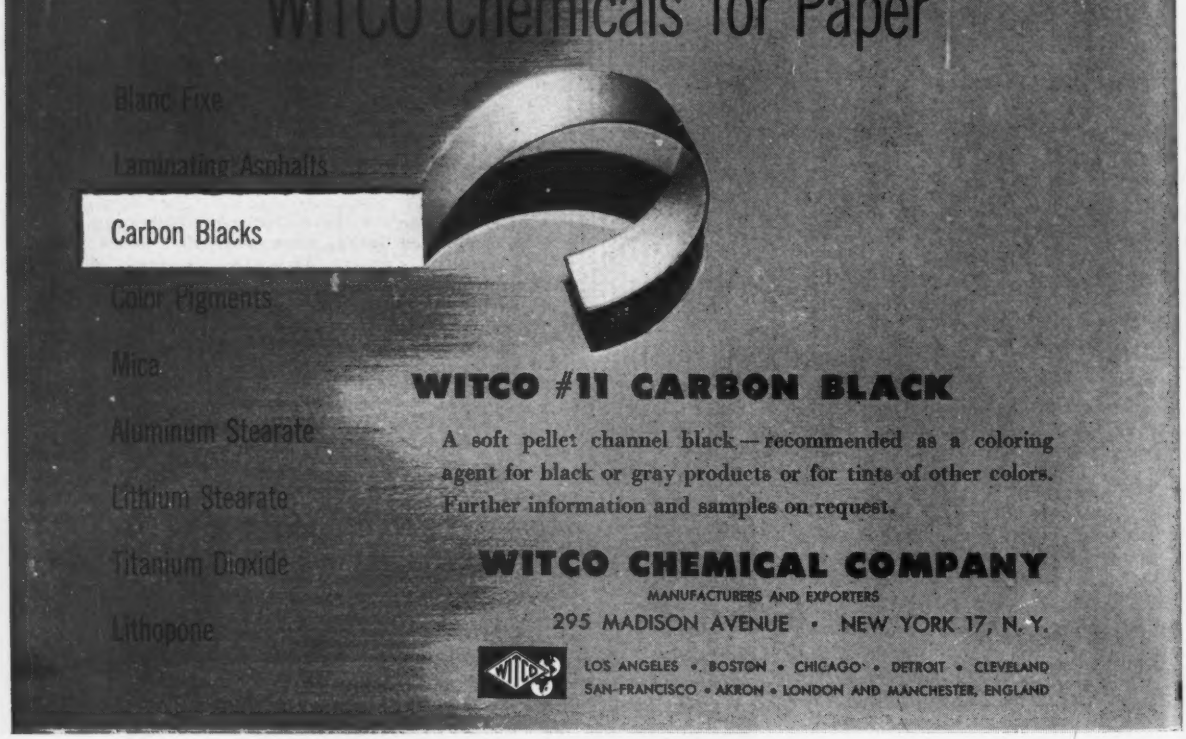
† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

## Industry Report

*(Continued from page 9)*

months and the tendency to carry shorter inventories was largely responsible for the reduction in overseas quotations for fourth-quarter delivery. Even though prevailing contract prices on overseas pulp remained from a few dollars higher per ton on unbleached grades to about $10 to $40 per ton on bleached grades, there were substantial tonnages of spot market domestic pulp being offered during the fourth quarter at prices less than prevailing domestic contract prices. Recent trade reports point to a lowering in Canadian pulp prices for export to the United States. A continuation of the adjustment in the pulp market may continue well into 1949 with accompanying price adjustment. Whether or not overseas contract prices will be reduced further for 1949 delivery as a means toward obtaining a greater share of the United States market remains to be seen.

Waste paper price trends were mixed in October, some grades going up, some down, and some remaining steady. However, prices on practically all grades of waste paper are down substantially from several months ago. The B.L.S. price index of all manufactured commodities dropped 3.8 points from September to October.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SECTION OF THE

TECHNICAL ASSOCIATION
OF THE PULP AND PAPER INDUSTRY

122 E. 42nd ST., NEW YORK 17, N. Y. Edited By R. G. MACDONALD, Secretary

# Developments in Testing of Paper and Paperboard—1946-1947*

By B. W. Scribner[1]

This resume of general developments in the testing of paper and paperboard is one of the reports on the subject prepared annually by the Chairman of the Paper Testing Committee, Technical Association of the Pulp and Paper Industry (TAPPI). Developments related to printability are not included as they are reported by the Chairman of the Association's Graphic Arts Committee. The members in the text refer to the bibliography. The report covers the period November 1946 to October 1947, inclusive.

## Physical Properties, General

Instrumentation report LV of the Institute of Paper Chemistry describes a method for determination of the bonding strength, or resistance to picking, of paper. A pair of steel wheels, having finely ground surfaces which carry films of a viscous oil, are rolled over the paper with varying speed until the speed at which the paper ruptures is determined *(1)*. Jacobson discussed the possibility of using formulas for the elasticity coefficient and the elastic curvature of a steel rod clamped at one end for the stiffness measurement of paper *(2)*. With reference to the Strachan-Messmer Elastometer, Strachan discussed the three factors involved in bending-micellar creep, elastic bending, and frictional bending *(3)*. Underhay, Browning, Fuller, Hudson, and Schofield described the tentative procedures of the British Paper Testing Committee for testing the wet bursting strength and tensile strength of paper. The latter is patterned on the TAPPI method *(4)*. A new method for measurement of relative humidity was developed by Lightgorn. The method employs an element, made of ceramic materials, whose electrical resistance changes with the relative humidity of the surrounding atmosphere *(5)*. Danielsen and Steenberg developed a procedure for quantitative determination of fiber orientation in paper by which the angles of a number of colored fibers in the paper are measured and used for calculations in distribution diagrams *(6)*.

## Permeability

Testing for permeability to fluids continued to hold considerable interest.

Pierce and Helms developed a method for determination of water-vapor permeability at low temperatures. The procedure consists of placing a source of water vapor inside a test container, sealing the test specimens in an impermeable cell stored at 0°F, and passing a controlled current of dried gas through the cell to remove the water vapor emanating from the specimen. The water vapor is absorbed by a desiccant which is weighed at regular intervals *(7)*. Aiken also described a method for measurement of water-vapor permeability at low temperatures, and discussed the factors affecting low-temperature determinations *(8)*. Various types of instruments used in general to measure gas permeability of sheet materials were discussed by Cartwright, and he described a new instrument of improved sensitivity *(9)*. A new device for determining the air permeability of very permeable materials, such as textile fabrics and certain types of papers, was described by the manufacturer *(10)*.

The Standard Method of the Packaging Institute for greaseproofness was published. This gives an accelerated comparison of the relative rates at which oils will penetrate packaging materials. Either turpentine or oil from the product to be packaged is used as the testing medium *(11)*.

Goldsmid discussed various methods used for determination of degree of sizing of papers, comprising those requiring inks, those using water penetration, those dependent on the chemical interaction of two solutions placed on either side of the test sheet, electrical methods, and humectation methods *(12)*. The results of a study of the K.B.B. galvanic sizing tester were presented by Harrison, Ainsworth, and Wright. They found the sizing degree to be unaffected by the electrolyte content of the paper, good reproducibility, and a degree of correlation with the dry-indicator method *(13)*. Harrison, Brown, Firell, Ralph, and Wells, in a report of the British Paper Testing Sub-Committee on Sizing gave an extensive discussion of methods used for testing the degree of sizing of papers, as a part of development work on a British standard method. They tentatively

* Presented by title at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Hotel Commodore, New York, N. Y., Feb. 23-26, 1948.

[1] Member TAPPI; Chairman, TAPPI Paper Testing Committee; Chief of Paper Section, National Bureau of Standards, Washington, D. C.

recommended the Cobb test and the dry-indicator method as fulfilling most of the requirements *(14)*.

### Chemical

A proposed A.S.T.M. method of test for the siliceous grit content of paper and paper products was published. It is intended to be a measure of abrasive particles which may cause rapid dulling of punches and dies, or of shear knives. The grit is separated by digestion of the ash of the paper with fuming nitric acid and then with sulphuric acid *(15)*. Bradley described an improved method for semi-micro quantitative analysis of paper ash and similar materials. The method depends chiefly on the use of 8-hydroxyquinoline for separating metals under controlled conditions of pH *(16)*. A method for quantitative determination of carboxymethylcellulose in paper was described by Eyler and Hall. The method involves extraction of the paper with sodium hydroxide, treatment with sulphuric acid to produce glycolic acid from the carboxymethylcellulose, and colorimetric measurement of the glycolic acid *(17)*. An extensive discussion of the various factors involved in determination of pH was given by Bloomquist *(18)*. With reference to moisture control of paper on the paper machine, Neal described the Hart Moisture Meter by means of which the moisture in reels of paper can be determined quickly and with an accuracy of within 0.1% *(19)*.

### Microscopy

Browning and Graff found that papers treated with viscose could be disintegrated satisfactorily for fiber analysis with hot calcium nitrate solution *(20)*. An article by Hamly and Sheard gives a presentation and an attempted valuation of the various factors governing successful observations with the microscope using fluorescence techniques *(21)*. Armitage discussed the measurement of microscopic objects and adjustment and use of dark ground illuminators and the illumination of opaque objects *(22)*.

### Optical

Harrison described a goniophotometer for gloss and color measurements, said to be particularly suitable for paper *(23)*. A TAPPI Tentative Standard for preparation of magnesium oxide standard for spectral reflectivity was published. This describes a procedure for depositing the smoke from magnesium, freely burning in air, onto a satisfactory base, such as aluminum or porcelain *(24)*. Gaegauf and Muller discussed methods employed for testing color, brightness and opacity of paper and described an instrument devised by them for the purpose *(25)*.

### Testing Related to Specific Products

Testing of shipping containers and packaging materials continued to receive considerable attention. The Packaging Institute made further progress in its development of standard test methods relative to packaging. These comprised moisture gain or loss of packages *(26)*, flammability *(27)*, and drop test *(28)*. An A.S.T.M. tentative method for determining the water vapor permeability of sealed "shelf-size" packages was published *(29)*.

The following were contributed by Quinn. A suggested formula for standardizing compression tests of corrugated fiberboard boxes: "All corrugated fiberboard boxes tested under compression to failure, endwise, sidewise, top to bottom, when conditioned and tested under standard procedure, must have strength in pounds not less than 15 times the weight of the box and its contents" *(30)*. A test of the strength of the creased edges of corrugated fiber boxes made by applying the bursting strength test to the creases *(31)*. Performance tests of cylindrical fiber boxes for high explosives comprising moisture conditioning for testing, bursting strength, puncture tests, compression tests, and drop tests *(32)*.

Tests were developed by the Air Material Command to find the thickness of a cushion required to protect a packed product when the amount of shock the most fragile part of the product can withstand without damage and degree of rough handling are known *(33)*. Hartwig described a method for locating points of gas leakage in packages and packaging materials. A cell is constructed with the test sheet or package and hydrogen sulphide is flowed into the cell under slight pressure. Gas leakage is detected by brown stains appearing in a stannous chloride coating on the outside of the cell *(34)*. The container testing laboratory of the Eastman Kodak Company, and its equipment, were described *(35)*. Also described is the "weather room" of General Mills where efficiency of packaging materials and keeping qualities of foods can be tested under varying temperatures *(36)*. Carlson discussed the testing of fiber drums, the tests used being drop tests, drop-puncture test, and compression tests. He mentioned that both TAPPI and ASTM are interested in the development of standard methods for drums *(37)*.

Quinn, as a result of his experience with the ring test method for measuring the edge crush of liner and corrugated boards, feels that this is a good criterion of the performance merit of corrugated fiber boxes *(38)*. A method for testing the glue-line strength of corrugated board was described by Green, Sams, and Wills. The test is based on separation of the liner from the corrugated medium by a tensile pull on steel pins inserted in alternate flutes of the latter. *(39)*.

Two articles dealt with the testing of insulating board. Wink and Van Den Akker consider the dry-indicator method for testing such board unsuitable and they proposed a new method. The board is placed in contact with water for a predetermined length of time, and the moisture content of layers of the board cut in planes parallel to the face of the board is determined. The content is compared with the fiber saturation point of the material, which is used as a criterion for judging the depth of penetration of the water *(40)*. Modifications of methods used in Sweden for testing the deflection and water absorption of insulating boards were suggested by Björn *(41)*.

McLean described the "Fault Detector" which is an instrument used for testing electrical sheet insulating materials for holes, conducting particles, and points of low breakdown, primarily at the finishing end of the making machine or process *(42)*.

### General

Steenburg discussed the application of statistical methods to testing data in the paper industry and gave examples of simple statistical methods *(43)*.

The A.S.T.M. Standards on Paper and Paper Products (with Related Information), as of October, 1946, was published.

Griffin reported the activities of the TAPPI Standards Committee for 1946, listing the new and revised standards and methods accepted by the committee during the year, and giving other information relating to TAPPI standardization activities *(44)*.

Scribner, Chairman of the TAPPI Paper Testing Committee, gave his annual report on developments in testing of paper and paperboard, covering the period November, 1946 to October 1947, inclusive *(45)*.

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# Evaluation of Fibrous Agricultural Residues for Structural Building Board Products*

## I. Methods and Equipment


By E. C. Lathrop[2] and T. R. Naffziger[3]



### Abstract

*The equipment and methods used at the Northern Regional Research Laboratory for evaluating fibers for structural board manufacture are described. A Schopper-Riegler freeness tester, with a modified orifice of 0.156 inch diameter and using pulp at 0.4% consistency, gives duplicable results on free and slow pulps and has a practical range. Comparison of physical properties between laboratory boards and commercial boards or 3 by 3 feet experimental boards made from the same pulps respectively, is shown to be quite close. With sufficient study it is possible to develop a factor between the strength values of small boards and a commercial board machine so that a close prediction of commercial operation may be arrived at in the laboratory. Data are presented showing the relationship between the moisture content of the board entering the drier and physical properties of the board. Density and strength factors increase with decreasing moisture content. By blending increasing proportions of hydrated pulp, the strength of the board at the same moisture content may be increased. The impact strength of commercial wood pulp insulating boards is low in comparison with boards made from bagasse or wheat straw. This is shown to be due to the long tough fibers which may be produced from residues. It is suggested that wood fiber boards could be increased in impact strength by the incorporation of properly refined wheat straw or bagasse long fibers. This is the first of a series of papers relating to the fundamental fiber properties of agricultural residues as related to structural board manufacture.*


Development work into the industrial utilization of fibrous agricultural residues at the Northern Regional Research Laboratory is directed towards a determination of those properties which will qualify them as preferred raw materials *(1)*. Superior or satisfactory insulation and panelboard products have been manufactured during a quarter of a century in whole or in part from sugarcane bagasse, wheat or rice straw, cornstalks, spent licorice root, and flax shives. Of these residues, sugarcane bagasse has been most widely used.

Although excellent products are produced from a variety of woods, it is possible by suitable pulping and refining of straws and stalks to produce long, springy, resilient fibers which cannot be produced in any manner from wood. The proper preparation and blending of such residue fibers produces strength properties, particularly impact strength, not obtainable from wood fibers at comparable densities in insulating board products.

Because of the expanding acceptance and use of fiber board products by the building industries a large potential industrial outlet for agricultural residues exists. Development work at the Northern Laboratory, directed to this end, has been underway for several years. In the belief that the greatest expansion in the use of agricultural residues will come about through a better knowledge of the specific properties of the fibers which may be produced from these residues as compared to wood fibers, and because little or no information has been published on the fundamentals of board production, this study has been of a fundamental character.

Practical results already have been obtained. The Northern Laboratory has developed a process for the manufacture of a series of board products from wheat straw which show exceptional merit in high strength and low density. From these results it appears that wheat straw compares more than favorably with sugarcane bagasse as a raw material. Details of this process are available at the Northern Laboratory.

The Structural Fibrous Materials Committee of TAPPI is at present making a survey of methods of evaluating fibrous materials in industry. The methods and equipment to be described are presented to imple-

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* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Hotel Commodore, New York, N. Y., Feb. 23-26, 1948.



[1] Northern Regional Research Laboratory, Peoria, Ill. One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

[2] Member TAPPI; Chemical Engineer, Head, Agricultural Residues Division.

[3] Member TAPPI; Chemical Engineer, Plastics and Building Materials Section, Agricultural Residues Division.

ment this committee's program. The techniques described below deal solely with the evaluation of pulps which have been prepared, refined, and washed and are ready for board formation. Freeness determination and methods of board formation, and drying are based on the essential principles involved in evaluating paper pulps after beating. The procedures are designed primarily for developmental work, or the comparative evaluation of pulps, and are somewhat in refinement of the methods used by one of the authors *(2)* over many years in industrial development of board products. Experience has shown that with a proper understanding of the important variables in commercial board machine and drier operations it is possible to translate the small-scale results obtained to full-scale mill operation with an error that does not exceed 5%, providing the mill-scale trial is properly controlled.

It is the viewpoint of the authors that laboratory boards of the thickness and density desired in mill production should be studied, dried either by hot air or in a platen press as required. Physical tests on the laboratory boards should be of the same character as used on commercially manufactured boards. Due to the fact that fibers in the laboratory board machine settle in a still pond, while fibers on a commercial machine are felted from a flowing suspension the physical properties of laboratory- and machine-made boards are not identical when the same stock is used. As a matter of fact, this is also true in comparing two board machines of apparently identical design and construction. It is possible, however, by proper comparison of laboratory and commercial board-machine products to obtain a definite relationship between the various physical properties of the two and thus predict with considerable accuracy commercial-board properties from such laboratory results.

These comparisons are not obtainable unless the laboratory work is done in a most meticulous manner. The rough character of the pulp used in structural-board manufacture often leads the worker to believe rough manipulations may be used. As a matter of fact, the long and coarse character of the fibers makes duplicate results more difficult to obtain than in evaluating paper pulps. Perhaps the most critical operations are proper sampling for the determination of moisture in the sample and the determination of consistency for obtaining freeness, and preparing pulp suspensions for board formation.

## Equipment

Figure 1 is a view of the laboratory showing the simple equipment used in the research work on insulation and structural board manufacture. This consists of a Schopper-Riegler freeness tester with an orifice of 0.156 inch as compared with the orifice of 0.08 inch used for paper pulps; a large mixing vessel and electric stirrer for preparing pulp suspensions; a board-forming machine which produces a board 11 inches in diameter; a small hydraulic press for expressing water from the wet board; a forced-draft drying oven provided with a balance for weighing the board, suspended on a balance arm during the drying cycle; and scales for weighing the board.

Figure 2 shows the assembly of the board-forming machine and Fig. 3 shows the design of the cast aluminum parts. This machine consists of a base to which is connected an outlet pipe and valve, two 1/16-inch brass plates in which slots ⅛-inch wide and ½-inch long on 1-inch centers are drilled, two 16-mesh wire screens and four or more rings 11 inches in diameter and 4 inches high. The machine is assembled by placing a drilled plate over the grooved surface of the base; a 1/16-inch screen is then placed on the drilled plate and four or more rings, depending on the volume of stock solution used, are assembled to form the head box.

## Method of Board Formation

The refined and washed stock or stocks, when blending of pulps is practiced, are treated with 0.03% Ligna-

FIG. 1
**View of the Structural Board Laboratory.**

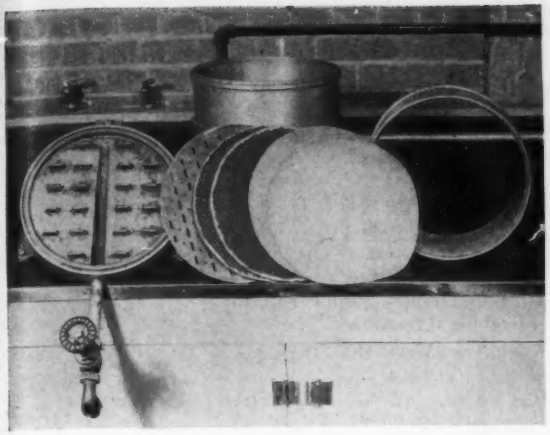


FIG. 2
Board-Forming Machine

san or like mercury compound and are then dewatered in a press to about 75 to 80% moisture content. The dewatered pulps are broken up by differential rolls having spiked teeth and are thoroughly blended by mixing. They are then put in G-I cans lined with heavy waxed paper and sealed around the lid with tape and stored in a cold room until used.

The moist pulp or pulps to be used for preparing boards are carefully sampled and the moisture content determined by drying to constant weight at 103°C. Based on this determination, the proper amount of pulp or pulps to produce the finished board of the thickness and density desired are weighed out. The pulp is diluted with water to 2% consistency in a crock or can and stirred for several minutes (10 to 15) with an electric stirrer. For some studies consistencies as low as 0.5% are desirable. A sample of the stirred and blended pulp is taken for freeness determination which is made at 0.4% consistency.

Boards are formed in the following manner: The outlet valve on the base of the assembled board machine (Fig. 2) is closed and the suspension of fiber and water is poured into the head box and stirred gently with a stick for about 30 seconds, after which the valve is opened wide. The time necessary for drainage of water is noted. During drainage it is often necessary to wash down fibers clinging to the sides of the head box with a water spray. For very accurate work the volume of this water may be noted. When free drainage is complete all rings excepting the lowest are removed, care being taken to see that they retain no fibers. A 16-mesh screen followed by a drilled plate is laid on top of the wet mass of fibers. On top of this is placed a round, cored aluminum block 1 inch thick. The machine is then placed in the hydraulic press.

The pulp mass at this point will be closely representative of that emerging from the cylinder or wire of a commercial-board machine. The volume of water drained will be that which will be returnable to the mill white-water system. If the commercial board machine with which comparison is being made is provided with a vacuum cycle or with suction boxes, the board in the laboratory-board machine may be given a vacuum treatment by attaching a vacuum system to the outlet valve of the board machine, adjusting the degree of vacuum and time to that corresponding to commercial practice. Drainage rates of boards made from different fiber preparations will indicate their relative water-holding capacities and filtration characteristics. The drainage rates are related to freeness but a close correlation between the two has not been found, largely because of the uncertainty of the drainage end point and the tendency of some pulps to hang up along the sides of the head box —a condition not encountered in commercial board formation.

In the operation of any of the types of the commercial-board machines it is necessary to pass the formed sheet between press rolls or similar devices to remove as much water as possible, commensurate with the desired properties of the dried board. To duplicate this operation, the board is pressed in the laboratory-board machine under appropriate hydraulic pressure. The water pressed out is collected in a weighed can. Pressure is gradually increased to about 25 p.s.i. and when the drainage has slowed down to a dribble, the pressure is released and the pulp mat removed and weighed. Knowing the weight of dry fiber used, the moisture content of the board at this point may be calculated. Papermakers' felts, cut to circles of 11 inches diameter are wetted and placed on each side of the wet board and on each of these are placed the drilled brass plates. This combination is returned to the press, using a block to replace the base of the board machine and using an aluminum block on top to fill the press opening. The board is alternately pressed and weighed until the desired moisture content is reached.

As will be noted later, this pressing operation has an

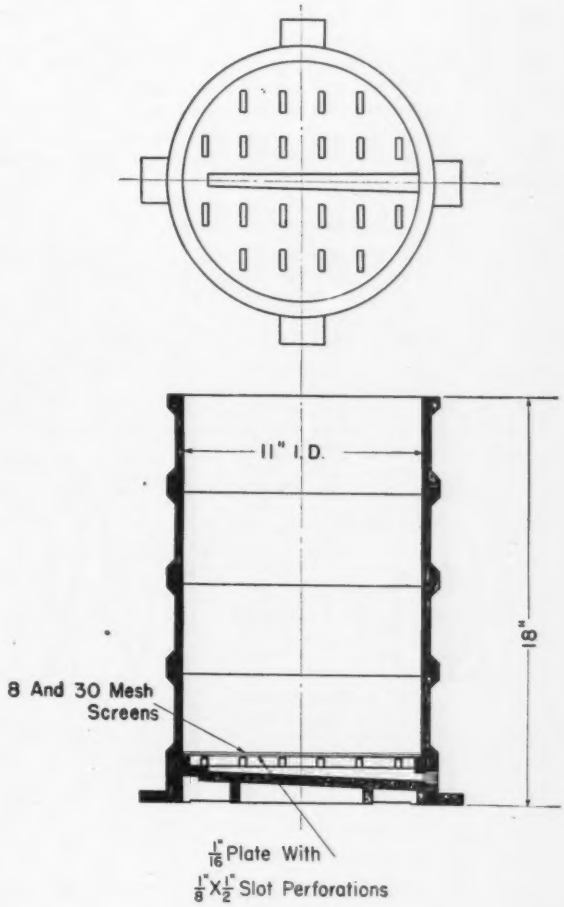



FIG. 3
Details of Board-Forming Machine.

important bearing on the physical properties of the dried board. The amount of water which must be removed in the drier is an important operating cost. For example, a board containing 50% moisture requires the evaporation of 1 ton of water per ton of board; one containing 66% water, the evaporation of 2 tons; and one containing 75% of water, the evaporation of 3 tons of water per ton of dry board.

The board is now dried to zero moisture content in an oven in which air at a temperature of 320°F. is circulated. Drying-rate studies may be made by suspending the wet board on one arm of the oven balance. On the basis of change in weight during the drying cycle the rate of water removal may be calculated. When the temperature and time of drying curve in a commercial dryer are known, oven temperature and air flow rates may be adjusted to duplicate commercial drying conditions. Finally, the dried board is cooled in a large closed container and weighed, after which it is tested for physical properties.

## Physical Tests

The bone-dry density of the board is calculated from its dry weight, thickness, and surface area as referred to an equal volume of water as 1.0. The board is then conditioned for 24 hours in a testing room maintained at 73.5° F. and 50% relative humidity, after which it is cut by the use of templates into the samples indicated in Fig. 4. Tensile and flexual tests are made by the use of a 10,000 to 20,000 Universal testing machine, and results are reported in p.s.i. Impact strength is determined on the Izod tester used for evaluating plastics and results are reported in foot pounds per square inch. The two-tensile, three-flexural, and four impact tests are averaged, respectively, in reporting results. A 24-inch diameter board machine is being built which will permit specimens to be prepared for testing in accord with ASTM designation C-46.

## Experimental Data

The following experimental data are of interest in showing the applicability of the method:

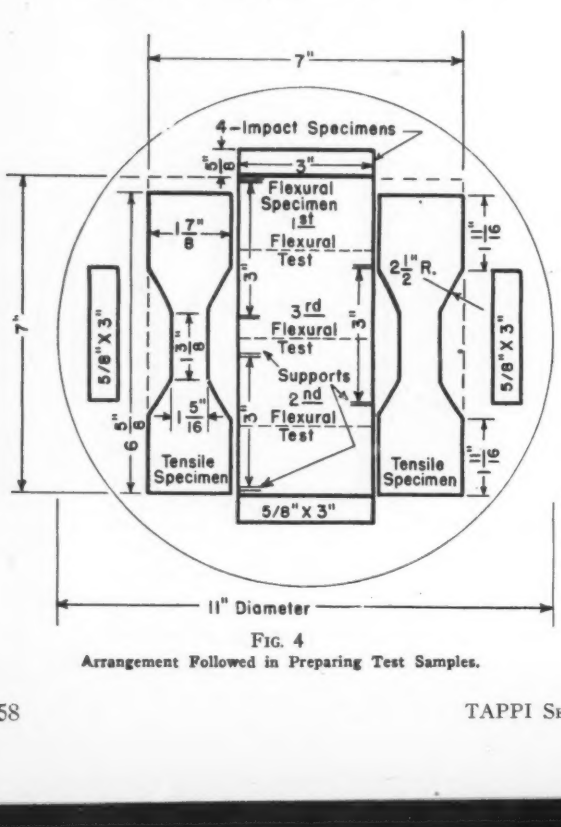



FIG. 4
Arrangement Followed in Preparing Test Samples.

### Freeness

Since pulps used for structural-board manufacture are considerably coarser, and contain fibers or fiber bundles longer, than those of paper pulps they are very much freer than paper pulps. Freeness testers designed for paper pulps must be modified to adapt them for use with board pulps. After some trials it was found that if the orifice of the Schopper-Riegler freeness tester was enlarged from 0.08 inch to 0.156 inch, satisfactory and duplicable freeness results could be obtained. The pulp consistency used in the test is 0.4% rather than 0.2% as with paper pulps. About 4 grams of pulp is collected as the sample for consistency determination.

Table I shows the freeness as determined by three operators on wet laps of groundwood pulp kindly supplied by one of the well-known manufacturers of insulating building board.

TABLE I.—FREENESS OF COARSE GROUNDWOOD PULP USED FOR INSULATING BOARD MANUFACTURE BY MODIFIED SCHOPPER-RIEGLER TESTER

| Sample | First Operator, ml. | Second Operator, ml. | Third Operator, ml. |
|---|---|---|---|
| 1 | 380 | 350 | 360 |
| 2 | 330 | 340 | 340 |
| 3 | 330 | 340 | 320 |
| Average | 347 | 343 | 340 |

Table II gives freeness results by three operators on a series of slow and free pulps composed of varying proportions of bagasse fibers, screened to definite lengths, and standard 9-point strawboard *(3)* pulp beaten to a freeness of S. R. 400 (orifice 0.08 inch).

TABLE II.—FREENESS OF A SERIES OF SLOW AND FREE AGRICULTURAL RESIDUE PULPS FOR BOARD MANUFACTURE

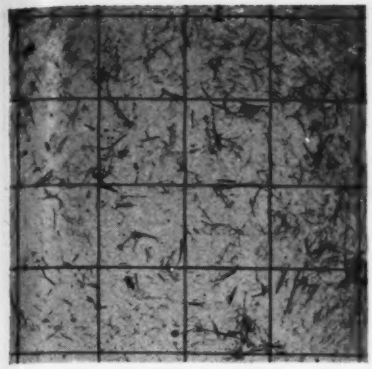
| Strawboard Pulp, per cent by weight | +½ inch Long Bagasse Fibers, per cent by weight | −½ inch Long Bagasse Fibers, per cent by weight | Individual Determination | | |
|---|---|---|---|---|---|
| | | | First Operator, ml. | Second Operator, ml. | Third Operator, ml. |
| 45 | 0 | 55 | 280 | 290 | 290 |
| 35 | 5 | 60 | 360 | 350 | 360 |
| 25 | 10 | 65 | 450 | 460 | 450 |
| 15 | 15 | 70 | 550 | 560 | 580 |
| 5 | 20 | 75 | 710 | 710 | 710 |

From these check tests it is evident that the results on slow and free stocks fall within a practical range and that reasonably accurate results may be obtained on the same pulps by several operators. Pulp suspensions for long-fibered board are much more difficult to sample accurately than is the case with paper pulps, and great care must be used in securing consistency samples.

## Relation Between the Physical Properties of 11-inch Boards and 3 by 3 feet or Commercial Boards

The relationship of the physical properties of 11 inch and 3 by 3 feet boards made from the same blend of standard 9-point strawboard pulp (40%) and a long-fibered wheat straw pulp (60%) is shown in Table III. The long-fibered pulp was made by cooking straw chopped to 1½-inch lengths in water for 1¼ hours at 40 pounds pressure in a rotary digester, then cooling and passing it through a Bauer refiner with a setting between the rotating plates of 0.025 inch.

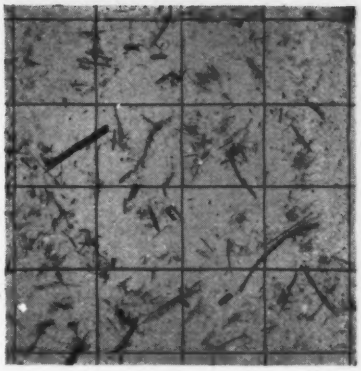
Samples of commercial insulating board made from groundwood, together with wet laps of the exact groundwood furnish from which the commercial board was made, were kindly supplied by one of the national manufacturers. It was stated that the commercial board contained 67.6% moisture when it entered the drier. Small 11-inch boards were prepared from the wet laps of the coarse groundwood and were dried at varying



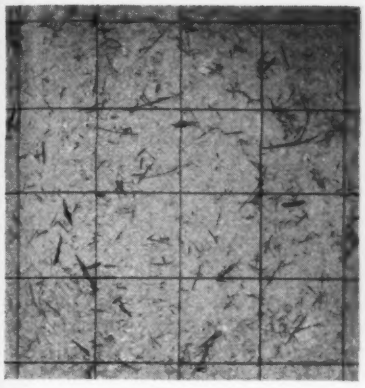
5a

FIG. 5

**Photographs (Actual Size) of Wood and Agricultural Residue Fibers Used in Insulation Board Manufacture.**



4d—Bagasse



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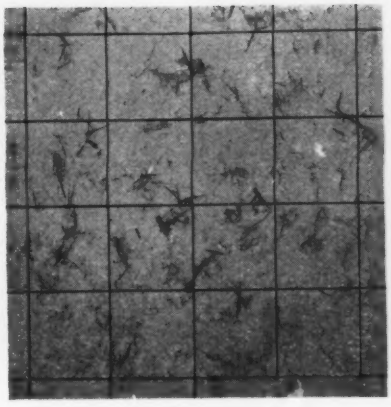

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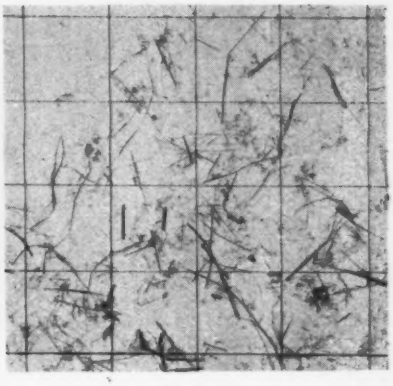

5e—Straw

TABLE III.—CORRELATION BETWEEN 11 INCH AND 3 BY 3 FOOT BOARDS MADE FROM THE SAME LOT OF WHEAT STRAW PULP (A BLEND OF 40% 9-POINT STANDARD STRAWBOARD PULP AND 60% CHOPPED, WATER-COOKED AND BAUER-REFINED WHEAT STRAW) DRIED AT THE SAME MOISTURE CONTENT

| Board, Size | Location of Sample | Thickness, inches | Density, g./ml. | Flexural Strength, p.s.i. | Tensile Strength, p.s.i. | Impact Strength, ft. lb./sq. in. |
|---|---|---|---|---|---|---|
| 11 in. | | 0.197 | 0.474 | 2,173 | 1,518 | 3.62 |
| 11 in. | | 0.195 | 0.460 | 2,070 | 1,661 | 3.56 |
| 11 in. | | 0.196 | 0.480 | 2,422 | 1,875 | 3.70 |
| 11 in. | | 0.197 | 0.478 | 2,205 | 1,798 | 3.55 |
| Average | | 0.196 | 0.473 | 2,218 | 1,713 | 3.61 |
| 3x3 ft. | N.W. corner | 0.176 | 0.466 | 1,961 | 1,796 | 3.49 |
| 3x3 ft. | N.E. corner | 0.178 | 0.474 | 1,842 | 1,698 | 3.13 |
| 3x3 ft. | S.E. corner | 0.176 | 0.482 | 1,977 | 1,928 | 3.35 |
| 3x3 ft. | S.W. corner | 0.179 | 0.523 | 2,622 | 2,078 | 3.50 |
| 3x3 ft. | Center | 0.172 | 0.489 | 2,035 | 1,579 | 3.50 |
| Average | | 0.176 | 0.487 | 2,087 | 1,816 | 3.39 |

moisture contents. The results of these tests, together with the physical tests on the groundwood commercial board, are reported in Table IV.

TABLE IV.—PHYSICAL PROPERTIES OF 11-INCH AND COMMERCIAL BOARDS PREPARED FROM INSULATING BOARD GROUND WOOD PULP

| Sample 11 inch Boards | Wet Board Pressed at lb./sq. in. | Moisture Content Into Drier, % | Thickness, inches | Density, g./ml. | Flexural Stgth., p.s.i. | Tensile Stgth., p.s.i. | Impact Stgth., ft. lb./sq. in. |
|---|---|---|---|---|---|---|---|
| 1 | | 79.7 | 0.708 | 0.222 | 145 | 120 | 0.67 |
| 2 | 20 | 74.3 | 0.633 | 0.251 | 190 | 163 | 0.71 |
| 3 | 30 | 71.3 | 0.587 | 0.267 | 198 | 163 | 0.74 |
| 4 | 50 | 68.1 | 0.558 | 0.281 | 235 | 191 | 0.76 |
| 4 Check | 50 | 67.0 | 0.553 | 0.287 | 263 | 214 | 0.57 |
| 5 | 70 | 65.4 | 0.532 | 0.292 | 244 | 215 | 0.98 |
| 5 Check | 70 | 65.3 | 0.527 | 0.300 | 288 | 241 | 0.75 |
| 6 | 90 | 60.6 | 0.491 | 0.323 | 331 | 265 | 0.76 |
| Commercial | | | | | | | |
| Cross 1 | | 67.6 | 0.511 | 0.287 | 278 | 197 | 0.66 |
| Cross 2 | | 67.6 | 0.515 | 0.288 | 291 | 226 | 0.60 |
| Cross 3 | | 67.6 | 0.514 | 0.289 | 267 | 224 | 0.69 |
| Length 1 | | 67.6 | 0.514 | 0.285 | 324 | 260 | 0.79 |
| Length 2 | | 67.6 | 0.515 | 0.287 | 323 | 262 | 0.65 |
| Length 3 | | 67.6 | 0.519 | 0.286 | 318 | 269 | 0.66 |

A comparison of the average physical values of the 11 inch boards and of the 3 by 3 feet boards in Table III shows a difference of less than 10% between the two in flexural, tensile, and impact strength. In considering these tests it must be borne in mind that insulating board is a rather nonhomogeneous material, as is shown by the test results on the various samples cut from the large board. It will be noted that the magnitude of variation between the average results of the small and large boards are generally of the same order as that between the various small boards and between the five samples cut from various portions of the 3 by 3 feet board.

TABLE V.—RELATION BETWEEN PHYSICAL PROPERTIES OF WHEAT-STRAW BOARDS AND THEIR MOISTURE CONTENT BEFORE DRYING

| Pressure Used in Expressing Water from Board, p.s.i. | Moisture Content of Board Into Drier, % | Thickness, inches | Density, g./ml. | Flexural Strength, p.s.i. | Tensile Strength, p.s.i. | Impact Strength, ft. lb./sq. in. |
|---|---|---|---|---|---|---|
| 60 | 70.8 | 0.461 | 0.292 | 674 | 642 | 2.66 |
| 80 | 67.0 | 0.410 | 0.326 | 829 | 743 | 2.96 |
| 140 | 61.8 | 0.368 | 0.362 | 1,040 | 826 | 2.67 |
| 300 | 56.2 | 0.338 | 0.393 | 1,231 | 1,063 | 2.87 |
| 400 | 52.5 | 0.315 | 0.423 | 1,280 | 1,162 | 3.80 |
| 600 | 48.2 | 0.285 | 0.455 | 1,357 | 1,310 | 3.81 |

The results in Table IV show that when small boards were made having a moisture content (68.1% and 67.0%) comparable with the moisture content of the commercial board as it entered the drier, their density and physical strength properties were closely comparable with those of the commercial board when the samples were cut in the cross-machine direction of the board. The samples cut from the commercial board in the lengthwise direction gave uniformly higher physical strength values than the cross-machine samples. This

difference is due to the felting characteristics of the particular board machine. In general, this same relationship will be found to hold for most commercial boards.

It is not possible, on the basis of a few tests, to develop a conversion factor for strength values between 11-inch laboratory-made boards and the commercial boards from any board machine. If sufficient tests are conducted in a most careful manner it has been the experience that a reliable set of conversion factors can be worked out so that satisfactory prediction of commercial production may be secured by the equipment and methods here described.

### Relation Between Physical Properties of Boards and Their Moisture Content Before Drying

The results in Table IV on 11-inch boards made from wet ground wood used for insulating board manufacture, show that as the moisture content of the board is decreased by pressing before drying that thickness decreases and all other physical properties listed increase except impact strength.

Table V presents similar results obtained on 70% long-fibered pulp blended with 30% standard wheat strawboard pulp beaten to a freeness of S.R. 400.

Here again a regular decrease in thickness and an increase in density, flexural, and tensile strengths, with some increase in impact strength takes place in the finished boards. Because they are subjected to higher pressures there is a consequent lowering of the moisture in the board prior to drying. The slope of the curves expressing these relationships will vary depending on the characteristics of each individual pulp.

### Relation of Proportion of Hydrated to Unhydrated Fibers to Physical Properties of Boards

In manufacturing structural insulating board the goal is to produce a board of sufficient strength with as low a density as possible. Insulating boards generally contain rather long-fiber bundles together with finer fibers. From the mechanical viewpoint these long-fiber bundles may be considered as beams or girders. Some material is required to spot weld or tie these structural members together in the board so that the maximum amount of small air spaces within the board will be produced. Hydrated pulp serves in this capacity. In the manufacture of insulating boards from groundwood, or groundwood and waste sulphite screenings, the groundwood supplies the hydrated pulp characteristic. In the manufacture of board from sugarcane bagasse when waste newsprint is used, the groundwood again supplies this hydrated pulp. In the operation of the Claflin defiberator undoubtedly a degree of hydration is produced in the refining of the wood chips at high pressure.

As an illustration of the effect of varying the proportions of hydrated and unhydrated straw pulp, when blended to form insulation boards, the data in Table VI is presented. In this study the two pulps were prepared as described for the studies presented in Table V, but the boards were each pressed to a moisture content of 70% prior to drying.

These data show a trend in boards containing increasing proportions of hydrated fiber to increase regularly in density and in flexural and tensile strengths. The impact strength, except in the boards containing 0% and 5% hydrated fiber, respectively, does not show a progressive increase with increasing proportions of hydrated fiber. A trend also will be noted that the boards progressively decrease in thickness as the percent of hydrated fiber increases, although each was subjected to 40 p.s.i. during the operation of expressing water from the wet boards.

TABLE VI.—EFFECT OF BLENDING VARYING PROPORTIONS OF HYDRATED AND UNHYDRATED WHEAT-STRAW PULPS ON PHYSICAL PROPERTIES OF BOARDS

| Hydrated Fiber, % | Moisture of Board Into Drier, % | Pressure Used, p.s.i. | Thickness, inches | Density, g./ml. | Flexural Strength, p.s.i. | Tensile Strength, p.s.i. | Impact Strength, ft. lb./sq. in. |
|---|---|---|---|---|---|---|---|
| 0 | 70.03 | 40 | 0.850 | 0.150 | 72 | 45 | 0.94 |
| 5 | 69.82 | 40 | 0.736 | 0.176 | 112 | 103 | 1.81 |
| 10 | 70.05 | 40 | 0.650 | 0.196 | 183 | 114 | 2.05 |
| 15 | 70.03 | 40 | 0.620 | 0.213 | 260 | 182 | 2.04 |
| 20 | 70.23 | 40 | 0.560 | 0.234 | 304 | 274 | 2.50 |
| 25 | 70.25 | 40 | 0.513 | 0.256 | 418 | 331 | 2.57 |
| 30 | 70.55 | 40 | 0.472 | 0.274 | 556 | 467 | 2.34 |

### Long, Resilient Agricultural Residue Fibers Impart High Impact Strength

In Table VII the physical characteristics of a number of commercial wood-fiber and bagasse boards, and 3 by 3 feet boards prepared from wheat-straw pulps are presented. Photographs of the fibers from which these boards are made are presented in Fig. 5.

These data and those of Tables III, IV, V, and VI show that within the lower density ranges the impact strength does not increase rapidly with increase in density, flexural, and tensile strengths. On the other hand, there is a striking difference between the impact strengths of the all-wood fiber boards and the bagasse and straw pulp boards. An examination of the respective fiber photographs shows these agricultural residue boards to be composed of a certain proportion of long resilient fibers as compared to the wood fibers. This suggests clearly that with the addition of a portion of properly prepared long resilient fibers from residues, such as straw or bagasse, the impact strength of commercial wood-fiber boards might be markedly increased. It is possible that some additional hydrated pulp would be required along with the long fibers to maintain satisfactory strength. Impact strength is associated with ruggedness or the ability of boards to resist dog-earing or breaking at the corners during handling—an important property.

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TABLE VII.—PHYSICAL CHARACTERISTICS AS RELATED TO IMPACT STRENGTH OF COMMERCIAL WOOD AND BAGASSE INSULATING BOARDS AND EXPERIMENTAL 3 BY 3 FOOT WHEAT-STRAW PULP BOARDS

| Board Tested | | Direction Tested | Thickness, inches | Density, g./ml. | Flexural Strength, p.s.i. | Tensile Strength, p.s.i. | Impact Strength, ft. lb./sq. in. |
|---|---|---|---|---|---|---|---|
| Wood fiber | Fig. 4a | Length | 0.522 | 0.260 | 188 | 110 | 0.36 |
| | | Cross | | | 171 | 115 | 0.39 |
| Wood fiber | Fig. 4b | Length | 0.513 | 0.266 | 256 | 176 | 0.38 |
| | | Cross | | | 181 | 134 | 0.32 |
| Ground wood, Table IV | Fig. 4c | Length | 0.514 | 0.288 | 322 | 216 | 0.65 |
| | | Cross | | | 268 | 264 | 0.70 |
| Bagasse | Fig. 4d | Length | 0.478 | 0.301 | 214 | 207 | 1.60 |
| | | Cross | | | 176 | 128 | 1.28 |
| Straw—10% hydrated; 90% unhydrated fiber | Fig. 4e | | 0.925 | 0.180 | 87 | 68 | 1.82 |
| Straw—30% hydrated; 70% unhydrated fiber | Fig. 4e | | 0.576 | 0.243 | 293 | 259 | 2.19 |
| | | | 0.483 | 0.279 | 477 | 419 | 2.18 |

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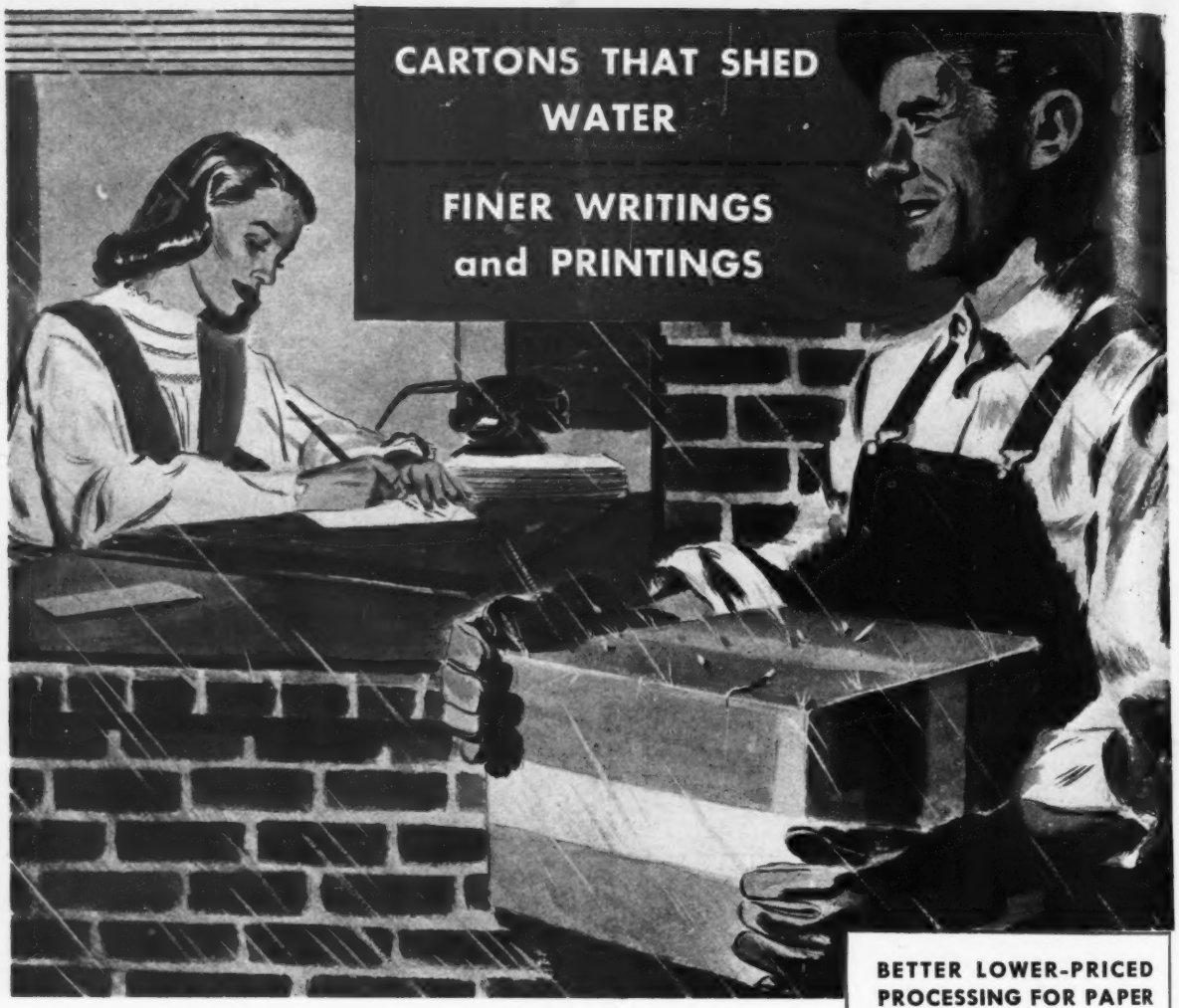


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